1992-06

Total Quality Management in logistics: a case study from the trucking industry

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Monterey, California

THESIS

TOTAL QUALITY MANAGEMENT IN LOGISTICS:
A CASE STUDY FROM THE TRUCKING INDUSTRY

by

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June 1992

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SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION Naval Postgraduate School 6b. OFFICE SYMBOL (*If applicable*) 55	7a. NAME OF MONITORING ORGANIZATION Naval Postgraduate School
6c. ADDRESS (*City, State, and ZIP Code*) Monterey, CA 93943-5000	7b. ADDRESS (*City, State, and ZIP Code*) Monterey, CA 93943-5000
8a. NAME OF FUNDING/SPONSORING ORGANIZATION 8b. OFFICE SYMBOL (*If applicable*)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (*City, State, and ZIP Code*)	10. SOURCE OF FUNDING NUMBERS Program Element No / Project No / Task No / Work Unit Accession Number

11. TITLE (*Include Security Classification*)
TOTAL QUALITY MANAGEMENT IN LOGISTICS: A CASE STUDY FROM THE TRUCKING INDUSTRY

12. PERSONAL AUTHOR(S) Harry Lehman, Jr.

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (*year, month, day*)	15. PAGE COUNT
Master's Thesis	From To	1992 JUNE	120

16. SUPPLEMENTARY NOTATION
The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

17. COSATI CODES			18. SUBJECT TERMS (*continue on reverse if necessary and identify by block number*)
FIELD	GROUP	SUBGROUP	Total Quality Management; TQM; Quality; Logistics; Trucking Industry

19. ABSTRACT (*continue on reverse if necessary and identify by block number*)

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20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION	
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS REPORT ☐ DTIC USERS	Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL Dan Trietsch	22b. TELEPHONE (*Include Area code*) 408-646-2456	22c. OFFICE SYMBOL AS/Tr

DD FORM 1473, 84 MAR 83 APR edition may be used until exhausted
All other editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE
Unclassified

Approved for public release; distribution is unlimited.

Total Quality Management in Logistics:
A Case Study from the Trucking Industry

by

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Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
June 1992

ABSTRACT

This thesis investigates the impact of the Total Quality Management (TQM) movement on the logistics industry as a whole, and, more specifically, its impact within the trucking industry. Its focus then narrows to study the practical aspects of implementing a W. Edwards Deming-based quality program within a particular trucking company, Mason Transporters, Inc. The effectiveness of the company's implementation effort is assessed using data collected from a survey questionnaire, formal interviews, and personal observations during an on-site visit. Successes and shortcomings of the implementation process are highlighted and discussed.

TABLE OF CONTENTS

I. INTRODUCTION

A. BACKGROUND

This thesis will investigate the practical aspects of implementing a W. Edwards Deming-based Total Quality Management (TQM) program within a company. It will examine the application of TQM theory and methodologies in the logistics industry as a whole, and then in a specific trucking company through the use of a case study analysis.

B. OBJECTIVE

"Quality" is a buzzword sweeping American manufacturing concerns, service organizations, and government agencies. In their headlong rush to implement quality programs, it is logical to assume that many of these businesses and organizations are not fully aware of the level of commitment required, or of the degree of organizational change necessary to make a program such as Deming's fourteen points work. By closely examining the experiences of one company, Mason Transporters, Inc. (to ensure anonymity and ease of data collection, the real name of the company is not used), some practical aspects of incorporating TQM will be highlighted and studied. These "lessons learned" should be helpful to any organization, private or government seeking to implement a quality program.

C. RESEARCH QUESTION

In this case study of Mason Transporters, an analysis of TQM implementation will be conducted based on two questions:

(1) What was the history of events and management decisions that led to the application of TQM at Mason Transporters, Inc.?

(2) How effective were those efforts to implement a quality program and what were the biggest obstacles to its success?

D. DISCUSSION

W. Edwards Deming's "Total Quality Management" approach to management has been widely touted as a way for American industry to produce the quality goods and services so desperately needed to remain competitive in the international marketplace. Ford Motor Company, Xerox, and Federal Express are but a few of thousands of companies, big and small, that have adopted the "new philosophy" of quality improvement. Indeed, even the U.S. Navy has sought to incorporate Deming's fourteen points to improve quality and productivity at its ship and aircraft industrial facilities.

In view of the tremendous impact of the Deming management philosophy, both on American businesses and on the military, this thesis will study a company which, five years ago, embarked on a course of action to implement a Deming-based quality improvement program (TQM). The Company, Mason

Transporters, Inc., is a regional tank truck carrier with headquarters in the Southeastern United States. The company ranks among the top ten tank truck carriers in the nation with over 600 tractors, 900 trailers, and 27 terminal facilities located in nine states. Operating revenue in 1990 was $76 million. In 1987, executives at Mason committed significant resources to begin a quality program in order to maintain market share in an increasingly competitive deregulated environment.

E. SCOPE OF THESIS

This thesis will follow a case study format and will describe the history of events and management decisions that led to the full implementation of TQM at Mason. It will then examine the effectiveness of those efforts; i.e., were the fourteen points successfully incorporated in the day-to-day operations of the company? The study will address problems that posed obstacles to successful implementation of the fourteen points and will provide suggestions to overcome those problems by drawing upon various theories from literature. Special focus will be given to company culture and resistance to change within an organization, and how those two factors can become barriers to the successful development of a quality program.

This thesis is concerned with the implementation of TQM and assumes the reader has a familiarity with Deming's

fourteen point management philosophy. Hence, only a cursory overview of Deming's fourteen points will be given.

F. METHODOLOGY

This thesis will trace the steps taken by Mason management to establish a quality program and will assess how successfully the fourteen points were implemented within the company. These two objectives will be accomplished by utilizing three research methods: observational, personal interviews, and a formal survey questionnaire.

1. Observational

As part of the research process, the author spent five days at Mason Transporters, Inc. observing company operations and talking to company officials in an attempt to appraise the degree of TQM implementation and the effectiveness of TQM implementation. A significant portion of that time was spent with the Mason Quality Manager as he reviewed the company's quality program and described its integration into day-to-day operations. In assessing the effectiveness of the company's TQM implementation, the company's conformance to five "quality criteria," was subjectively judged. These criteria were largely borrowed from the 1992 Malcolm Baldridge Quality Award examination process.

2. Personal Interviews

In addition to an ongoing discussion with Mason's Quality Manager, formal one-on-one interviews were conducted with selected members of management. Participants were judgementally selected based on how long they had been with the company and to what degree they were involved in the quality program implementation. After the same ten questions were asked of each manager, responses were summarized and consolidated.

3. Survey Questionnaire

A 34-question research instrument was designed to measure the degree of implementation of Deming's fourteen points. The survey was administered to a simple random sample of 60 Mason employees drawn from a population (frame) of all employees (approximately 1100). The sample was not stratified and all Mason employees--management, hourly workers, and drivers--were equally likely to receive a survey. Survey responses were quantified (using Likert scale) and tabulated. Although conclusions were drawn, no statistical inference is argued.

G. LITERATURE REVIEW

A literature review was conducted utilizing the resources available at the Naval Postgraduate School library. Sources emphasized dealt with the practical aspects of TQM implementation, particularly logistics/transportation

periodical literature.

H. ORGANIZATION OF THE STUDY

This thesis is organized into five chapters. Chapter I gives a broad overview of the purpose and direction of the study, and introduces briefly the research methodology. Chapter II provides background on the subject of TQM, and examines the effect the TQM movement has had on the logistics/trucking industry. Chapter III introduces the company that is the object of this case study, Mason Transporters, Inc., and gives a historical chronology on the implementation of TQM at Mason. Chapter IV provides an analysis of the data gathered and attempts to judge the effectiveness of TQM implementation at the company based on five evaluation criteria. Finally, Chapter V highlights some successes and shortcomings of Mason's implementation effort and concludes with recommendations for a more successful result.

II. BACKGROUND

A. TQM: A BRIEF OVERVIEW

An expensive steak lunch at a Tokyo hotel has so relaxed a Japanese electronics executive that he gives a rare glimpse of his "honne," his innermost feelings, to an American guest. He chats about the problems at his U.S. subsidiary, which manufactures television sets and video equipment. Finally he leans conspiratorially over his $5.00 cup of coffee and asks: "Do you know a U.S. company that makes good parts?" (Dreyfus, 1988, pg.80) The image of American products is still summed up by the common Japanese and European attitudes: "You Americans don't make anything we want to buy." And by the Japanese repairman who, when asked what was wrong with a garbage disposal machine he was fixing, replied, "It's American." (Knowlton, 1988, pg. 40)

Fortunately, times are changing. At a conference in Tokyo in 1990, J. M. Juran, the noted American quality consultant, made a rare prediction. Surveying an audience of mostly Japanese executives who have used his total quality control methods to humble their U.S. competitors, he declared that America is about to bounce back. In the 1990s, "Made in the USA" will become a symbol of quality again, he said. (Port, Carey, 1991, pg. 8)

It remains to be seen if Juran's vision will be fulfilled. One thing is certain, major industries in the U.S. have finally awakened to the urgent need to match the close-to-perfection quality standard set by Japan after 40 years of dogged effort. American executives now realize that unless the quality of their goods and services is dramatically improved, market share in vital industries will continue to decline relative to foreign competition. This decline will bring enormous difficulties to the American economy and a certain decline in the standard of living in the United States.

In an effort to incorporate quality into their products and services, American executives have turned increasingly to a revolutionary management method often referred to as Total Quality Management, or TQM. Although TQM is a broad concept that can mean different things to different people, it is perhaps best embodied and most notably espoused by the philosophy of Dr. W. Edwards Deming. Dr. Deming traveled to Japan to preach his quality philosophy shortly after World War II, finding an eager and willing audience among Japanese industrial policymakers. His quality methods were adopted just as Japanese industry was rebuilding after wartime decimation. Dr. Deming is now widely credited as a key factor in making Japanese goods the hallmark of quality the world over.

So what did Deming teach the Japanese? Deming's basic philosophy states that quality improves as variability decreases. To monitor variance, he advocates a statistical method of quality control. That is, instead of inspecting products "en masse" for defects once they have been manufactured, companies should strive for continuous improvement using statistical methods and analysis to maintain quality. Deming advocates on-line quality control rather than in-line quality control. In other words, companies should produce products of high quality in the first place rather than depend on detecting defective products later through inspection. (Traffic Management, July 1990, pg. 35)

To obtain that on-line quality control, analysts sample products during manufacture to determine the product's deviation from an accepted range. As Deming sees it, any deviation is the result of one of two kinds of variables, either a "special cause" stemming from fleeting random events, or a "common cause" arising from faults in the system. According to Deming, special causes account for only 6 percent of all variations, while 94 percent of all deviations can be traced to common causes. Deming's says that most companies spend too much time trying to determine the nature of special causes rather than examining the system to find out what's behind the common causes. (Ibid.)

Deming lays the blame for these system-related problems squarely on management, not the workers. Like most other

quality "gurus," he is highly critical of modern American corporate management. If a company is having problems, Deming lays most of the blame with management for not having created the right system. (Ibid.)

Aside from his roles as statistical-control advocate and management critic, Deming was one of the first to stress the importance of market research. In fact, he was instrumental in teaching the Japanese how to conduct surveys to determine what a customer wants before making a product. Observes John Langley, a professor of marketing and logistics at the University of Tennessee,

> A central theme of Deming's work is the focus on customer satisfaction. He repeatedly underscores the importance of determining who the customers are and what their needs are, then developing strategies to meet those needs. (Ibid., pg. 37)

Approaching the problem of quality management from a statistician's perspective, Deming's early work focused primarily on improving quality in manufacturing through the use of statistical quality control procedures. More recently, however, he broadened and amplified his approach through his 14 principles for quality management. (Saraph, Benson, Schroeder, 1989, pg. 812) He views these principles, or points, as the basis for the transformation of American industry. According to Deming, adoption and action on the 14 points is a signal that management intends to stay in business and aim to protect investors and jobs. Such a system formed the basis for lessons learned for top management in Japan in

1950 and in subsequent years. (Deming, 1982, pg. 23) The 14 points are as follows:

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business.

2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.

3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.

4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.

5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.

6. Institute training on the job.

7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.

8. Drive out fear, so that everyone may work effectively for the company.

9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.

10. Eliminate slogans, exhortations, and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.

11a. Eliminate work standards (quotas) on the factory floor. Substitute leadership.

11b. Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.

12a. Remove barriers that rob the hourly worker of his right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality.

12b. Remove barriers that rob people in management and in engineering of their right to pride of workmanship. This means, inter alia, abolishment of the annual or merit rating and of management by objective.

13. Institute a vigorous program of education and self-improvement.

14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job. (Ibid.)

The belief that workers want to do a good job permeates these points as does the need to take power out of the boardroom and bring decision making to the factory floor. Factory workers are taught statistics so that they can keep control charts on their progress toward improved quality. Everyone in the organization, from board members to janitors, receives training in quality control concepts and statistics, and each and everyone studies the organization and suggests ways to improve it. Workers not only do work, but they also improve the system. (Tribus, 1988, pg. 26)

Of course, the term Total Quality Management has come to mean more than just the teachings of W. Edwards Deming. There are several other prominent quality "gurus" that have been embraced by industry in their efforts to adopt a TQM program

of continuing improvement. Chief among these are Joseph M. Juran, Philip B. Crosby, Genichi Taguchi, and A.V. Feigenbaum. These and other "quality improvement" authors repeatedly discuss the importance of such critical factors as top management leadership for quality, supplier quality management, process management (process design and control), employee training, and employee involvement. A fundamental premise of the literature implies that as the decision makers of an organization focus on better management of such critical factors, improvements will occur in quality performance and ultimately result in improved financial performance for the organization. (Saraph, Benson, Schroeder, 1989, pg. 810)

So, in a real sense, there are more similarities than differences in the various quality gurus. While this paper focuses primarily on a Deming-based quality program, its use of the term TQM encompasses not the specific teaching of any one personality, but the overall philosophy which ties them all together: achieving quality through continuing improvement. The experiences of one company, Carolina Freight Carrier Corp., well illustrate this idea. According to Carolina's director of quality improvement, Doug Williams,

> All our quality awareness, training and recognition programs came from Crosby. But then we realized that we needed to pick and choose from other quality disciplines. (Distribution, August 1991, pg. 96)

So Carolina added some Deming principles to provide for stricter controls and measurement, and then some principles

from Tom Peters' "Excellence Philosophy" because it stressed customer service. Says Williams, "A quality process is only effective if it's tailored to fit the personality of the company." (Ibid.)

B. TQM IN THE SERVICE INDUSTRY

When considering quality improvement, people tend to think of manufactured goods, things like automobiles, appliances, and copy machines that we can see, touch, and measure. But clearly, quality is no longer an issue reserved for steel plants and automobile factories. After being viewed as a manufacturing problem for most of the past decade, quality has become a service-sector issue; industries ranging from banking to insurance to airlines are finding that quality is as viable a marketing tool as price. (Armstrong, Symonds, 1991, pg. 100)

This realization is coming in the face of a tight economy, and a growing refusal on the part of customers to stand for anything less than the best. Increasingly, service providers find that customers don't complain, they just go somewhere else. (Ibid.) Poor service has become an issue for managers for the same reason shoddy goods did: competition. Deregulated service industries such as telecommunications, airlines, and trucking suddenly find themselves confronted with aggressive rivals previously not in the picture. (Rose, 1991, pg. 97)

The service industry is searching for answers to quality problems, following in the footsteps of manufacturing where product quality has now become almost a given. Says one executive of Savin Corp.,

> The service sector in the U.S. in 1991 bears an eerie resemblance to American manufacturing 10 or 15 years ago. Costs are high. Profit Margins are narrowing. Quality standards are inconsistent at best, and competitive pressures are mounting each year. (Williams, 1991)

But often, managers find the transition from improving manufacturing quality to improving service quality elusive. This is due in large part to the fleeting nature of the product. "You can't use the traditional measuring tools to measure it or inspect it before you deliver it," says James A. McEleny, vice-president for corporate quality improvement at Chicago & North Western Transportation Co. Because service quality can be gauged only by customer satisfaction, TQM has redefined what quality is. "Quality has moved from a set of numbers on a chart to what feels right to the customer," says operations-management professor Joseph Blackburn of Vanderbilt University. (Rose, 1991, pg. 100)

But whatever the differences between manufacturing and services, it is clear that TQM applies to both. Deming himself makes this plain in his book Out of the Crisis. In discussing service industries he states,

> Eventually quality improvement will reach not only the production of goods but the service industries as well--hotels, restaurants, transportation of freight and passengers, wholesale and retail establishments, hospitals, medical services, care of the aged, perhaps

even the U.S. mail. (Deming, 1982, pg. 14)

Indeed, many service companies have successfully adopted TQM and produced stunning improvements in their service quality--Federal Express, United Parcel Service, and Savin Corp. are but a few examples. After adopting a Deming-style TQM approach to improving service quality, Savin reduced service expenses 35% over the past 12 months while improving service quality. Writes one Savin executive,

> One should not conclude that total quality management and statistical analysis are the exclusive territory of a handful of specialists. Total quality management is an approach to doing business that should permeate every job in the service industry....If the U.S. service industry is to survive and prosper, TQM should be the approach followed by everyone in the industry. (Williams, 1991)

And yet, there is little doubt that the service industry has a long way to go in fully embracing TQM. A scant 10% of American service companies have any kind of quality program, reports Gunneson Group International Inc., a quality consulting company in Landing, N.J. But, it predicts, by the year 2000, perhaps 70% of those with more than 500 employees will have formal quality initiatives. (Armstrong, Symonds, 1991, pg.100)

C. TQM AND THE LOGISTICS INDUSTRY TODAY

Ninety-seven U.S. firms applied for the Malcolm Baldrige Quality award in 1990, more than double the number of entrants a year previous. Criteria for winning this prestigious award extend to all operations of the company, not just a quality

product. This quest for quality even reaches beyond the company to include suppliers and service providers. As these companies develop internal quality programs, increasingly, they are requiring suppliers and service providers, especially those in the transportation field, to meet ever more rigid quality standards. (Richardson, 1990, pg.18)

Furthermore, according to a recent study by the Council of Logistics Management, leading quality companies are coming to view logistics as a key business process that creates value for both the customer and the company. These companies recognize that logistics weaves together all of the major operational functions of the business to meet customer requirements, and they use logistics to integrate suppliers and service providers such as carriers and public warehouses. (Distribution, August 1991, pg.13) Logistics quality is coming to be seen by firms as a key link in overall quality improvement.

It should not be surprising that in the decade of the 1990's, as the quality battle has shifted from product to service differentiation, the field of logistics has come into its own. U.S. companies recognize increasingly that top-notch service is not a discretionary item anymore. According to Ohio State's Dr. Bernard J. Lalonde, who has done studies on the relationship between logistics and customer service, service has become an essential element of doing business in the 1990s. (Traffic Management, June 1991, pg. 39)

> For the shipper, customer service provides a competitive advantage and improved asset productivity. For carriers, good service can provide barriers to switching and allow them to focus on non-price considerations. (Ibid.)

In other words, customer service is the key to survival for both shippers and carriers. Improving customer service, in turn, simply cannot be done without improving logistics quality. Service is defined in the minds of the consumer, and his definition generally includes such things as ease of placing orders, meeting promised due dates, accurate shipments, and delivering shipments complete. It follows then, that good service can be defined as good logistics. (Ibid., pg. 40)

1. **TQM and the Shipper-Carrier Relationship**

It is a simple fact of business that a company's service quality improvement effort depends in large part on how well their carriers perform. In a very real sense, they are an extension of the shipper to the customer. One veteran traffic manager summed it up succinctly, "To the extent that they (the carriers) are successful in serving our customers, we are successful as a company." (Ibid., pg.43)

For this reason, logistics managers realize that transportation service providers must be brought into the quality-fold, not through coercion, but through an understanding of how quality will benefit them as well. (Traffic Management, July 1990, pg. 45) By its very nature, then, a logistics quality program requires a coordinated

shipper-carrier effort. According to C. John Langley, professor of transportation and logistics at the University of Tennessee,

> It is essential that these firms share information, strategies, and sometimes resources. Quality service is becoming the driving factor in the relationship between suppliers and users of logistical services.

For that reason, he says, it is not surprising to see the terms quality and partnership being used with increasing frequency. (Traffic Management, May 1991, pg. 38)

A good example of this shipper-carrier relationship can be found at the Motorola Company. According to Kathy Sullivan, the communication process works this way,

> Essentially, the Motorola Transportation Council tells the carriers that we want to do business with them and we really want to keep them in business. And to do this, they need to understand process management and they have to understand our requirements as a customer. We also tell them that we want to understand their business too.

It is in this candid, cooperative environment that Motorola and its carriers set performance standards and cost requirements. All of these standards are continuously measured, not only by Motorola but also by the carriers themselves. This growing trend toward self-measurement, Sullivan believes, reinforces the notion that the shipper and the carrier are, in fact, engaged in a partnership. (Traffic Management, July 1990, pg. 45)

Of course, not all carriers are in tune with the TQM principles, and some view shipper's quality programs as nothing more than requests for special treatment. It is not

surprising, then, that as Xerox charged ahead with its quality program, it found itself dealing with fewer and fewer carriers. The relatively few carriers the company does use, however, provide a high level of service. Moreover, they have designed their processes to conform to Xerox's requirements. (Ibid.)

Increased demand for top-notch service places even more importance on a relationship that spans more than one task and signifies exchange of both information and trust. In 1980, Dupont used 3000 carriers. Today it uses about 50 (Mason Transporters is one of these). This reduction reflects not so much a move to reduce the number of contacts but rather a philosophy of selecting the best possible partner to do the job. Says Dupont's transportation procurement manager, Charles Verna,

> If a partner is really the best, give that partner a chance to do the job. We commit to carriers, even though it makes us vulnerable, and they commit to us. We commit to a single source at some sites. That requires trust. (Richardson, 1990, pg. 20)

2. Defining and Measuring Transportation Quality

What is quality in transportation? Really no different than in any other industry--quality means <u>consistent satisfaction of customer requirements and expectations</u>. As more and more companies adopt quality programs, those requirements and expectations are becoming more stringent for carriers. On-time, error-free, zero-defect delivery is the

rallying cry of major shippers, especially those using just-in-time (JIT) inventory methods. (Richardson, 1990, pg. 18)

For example, Steelcase, an office furniture manufacturer, cites such criteria when looking for a carrier. Steelcase sets up its furniture installations in stages; therefore, their carrier's ability to deliver at a specific date and time is critical. In addition, carriers need the versatility to handle both cartoned and uncartoned furniture damage-free, in clean equipment. After all those conditions are satisfied, Steelcase looks at price. According to their distribution service manager,

> Service standards are not negotiable, price is. We look at the most cost-effective price we can get, not necessarily the lowest cost. (Ibid. pg. 19)

Of course, shippers have different products, which in turn results in different transportation requirements. A prominent logistics periodical, Traffic Management sponsored a survey, conducted by an independent research firm, of 150 randomly selected shippers. When asked to define the specifics of transportation quality, three out of every four respondents mentioned on-time pickup and delivery. In this regard, many noted that their companies had instituted just-in-time delivery or other time sensitive programs--thus the heavy emphasis on-time performance. (Traffic Management, May 1989, pg. 39) The next two most common definitions of quality in the survey were the general "dependable/good service" and the more specific "damage-free delivery with no claims hassles."

Surprisingly, only 30 percent of the respondents mentioned rates, placing fourth behind the three service-oriented definitions. (Ibid.) Respondents often combined multiple attributes in their definitions. One recurring definition of quality, for example, was "prompt service and fair pricing." Another respondent incorporated all of the top key elements in his definition, stating that "Quality is delivering on time per the promised schedule at a reasonable price without damage to the merchandise." Given these service-oriented definitions, it is not surprising that three out of four shippers surveyed said that they emphasized quality over price when selecting a carrier (Ibid.).

Another logistics periodical, Distribution breaks down transportation quality into five areas:

- **On-time performance:** on-time pickup and delivery; consistent, dependable schedules and transit times
- **Equipment and operations:** equipment availability; condition of equipment; helpfulness of drivers and staff; frequency and severity of loss and damage; safety
- **Value:** competitiveness of rates with carriers offering similar service; relationship of prices to service levels provided; simplicity of tariffs and contract prices
- **Customer service:** willingness and ability to quickly answer inquiries and solve problems; promptness of claims settlement; EDI capability
- **Sales staff:** knowledge of shipper needs and carrier capabilities; responsiveness to special requirements; frequency, regularity and effectiveness of sales calls. (Distribution, August 1991, pg. 29)

Quality transportation does have a dimension, though, that most people don't talk about. Besides being all that you

would expect in terms of on-time delivery and lack of damage, quality in transport also means flexibility. A transport supplier has to meet requirements--even as those requirements change. This ability to change with requirements is what makes measuring quality performance in transportation so tricky. (Gallagher, 1988, pg. 112)

Quality measuring in transportation is in its infancy when compared to manufacturing, where SPC and the like have been around for years. There is barely a handful of transport companies that measure their services comparably to the way thousands of manufacturers measure their production processes. (Ibid., pg. 113)

On the receiving end of transportation services, however, progress is being made. According to the survey sponsored by Traffic Management previously mentioned, a considerable number of shippers have taken concrete measures to ensure that their quality programs are met. Specifically, 36 percent have instituted formal carrier-evaluation programs in their traffic or transportation departments. Another 9 percent, moreover, plan to implement such a program within the next year. This strongly suggests that transportation quality has passed beyond the buzzword stage and become a business reality. (Traffic Management, May 1989, pg. 39)

However quality is defined, in transport, as in other businesses, quality has become a competitive issue. Some U.S. transport firms have seized the quality issue in an effort to

distance themselves from rivals. Companies that buy transport services know quality transport can literally make or break them. (Gallagher, 1988, pg. 112)

D. THE QUALITY MOVEMENT'S IMPACT ON MOTOR FREIGHT COMPANIES

As already discussed, the heightened interest in quality and TQM throughout industry clearly manifests itself in the transportation/distribution area. Since over 90% of freight is, at some point, moved by trucking, it follows that there has been a tremendous impact on the motor freight industry. Thus far in the discussion the term "carrier" has pertained primarily to the trucking industry, but could also included such other freight haulers such as rail, air freight, and water carriers. This section will now explore how strongly the quality concept has taken hold specifically within the trucking industry.

Most motor freight carriers who have adopted some sort of quality program--be it Deming, Crosby, or Juran--have done so because their major customer(s) have "pushed" it down to them. As companies demand increasingly stringent levels of service from transportation providers as a result of their own quality programs, trucking companies realize that they must either get on the quality bandwagon or lose critical customers. When large industrial concerns such as Dupont, 3M, and Exxon begin reducing their carrier base to those trucking companies who can "partner" with them in a continuing improvement program,

the ability to demonstrate a strong TQM program quickly becomes a matter of survival in the competitive environment of motor freight.

A good example of the profound impact a major customer can have on individual common carriers can be found at the 3M Company. There, the "Partners in Quality" program, a highly successful carrier quality program which coincided with--and was encouraged by--a strong corporate quality program, is summed up neatly in five words: "Consistent conformance to customer expectations." For carriers, this translates into strict adherence to a set of performance standards that result in predictable, consistent, reliable customer service on every single shipment. 3M's transportation department and its carrier partners hammer out the performance standards in a series of meetings. Once the performance standards are agreed upon, that's it. The carrier partners are expected to live up to those standards every time. 3M gauges carrier performance against the standards on an ongoing basis. Whenever a problem is identified, corrective action through mutual participation is quickly initiated. According to 3M's director of transportation,

> Once carriers become involved in our quality program, they want to perform better. Carriers participating in the program, in fact, oftentimes come up with excellent suggestions on how 3M can do things better. (Traffic Management, May 1989, pg. 48)

Another example of how a major shipper's quality program can significantly affect its carriers, is Union Carbide.

Safety is of paramount concern to Union Carbide Corp., a worldwide chemical and plastics manufacturer. For that reason, quality and safety go hand-in-hand in the company's program to monitor the performance of its tank-truck and long haul motor carriers. (Ibid., pg. 50)

The company initiated the "Flagship Program" to select and monitor tank-truck carriers it uses at a dozen liquid-bulk shipping locations. The thrust of the program was to compress the number of carriers and to deal with a smaller number on a national basis. In selecting those carriers, Union Carbide set forth key requirements for doing business, the most important of which was safety. According to Union Carbide's transportation director, Eugene Iarocci,

> We wanted to make sure we were hiring the safest carriers out there. We'd forgo transportation savings for a carrier with a better safety record. (Ibid., pg. 52)

If Union Carbide's careful analysis uncovered any infractions that could affect shipment safety, the company asked the carrier to correct them in 60 to 90 days. Those that did not comply within that time period were dropped from the roster. On the basis of that philosophy, Union Carbide eventually reduced its tank-truck vendor base from 75 to 25. The remaining carriers handle Union Carbide's 50,000 liquid-bulk shipments each year. Says Iarocci,

> We're going to create strategic alliances with a critical few carriers. I'm only going to do that with carriers I feel comfortable with. (Ibid.)

Although there is no data available on the number of trucking companies that have adopted the continuing improvement philosophy of TQM, it is apparent that a number of major motor freight carriers have employed TQM with considerable success. The following brief examples illustrate (in size, all rank in the top ten of national motor freight carriers):

1. Consolidated Freightways

For a large conglomerate like Consolidated Freightways (CF), the key to achieving quality was the empowerment of its workers. Not only strategic planners and salespeople, but the loaders and stackers as well. They understood that for quality to really take hold, a dramatic shift in corporate culture had to occur. (Mueller, 1991, pg. 72)

CF believed that the quality process was a way to bring decision making to the workers in the field. For management, the biggest challenge is trusting those workers to make the right decisions. Explains CF's Vice President of Quality Gary Keenan,

> The trucking industry lives on frail margins. We can no longer support layers of middle managers. When the workers know that trust is seeping down, then pretty soon ideas start bubbling up. (Ibid.)

A huge company like CF, with subsidiaries and divisions all over the nation, implements its quality crusade with a quality council called CF EXCEL. Its mission is to not only ingrain quality in the various CF companies, but to spur a

shift in focus from internal measurements to those based on customer satisfaction. The council sets the corporate quality agenda and oversees the education and training of all 2200 CF employees. The goal is to bring into the fold workers that have traditionally been left out of the planning process. To that end, Quality training for warehouse workers extends well beyond lapel pins and pep talks. It includes training with Pareto charts, fishboning, histograms and distribution of Corrective Action forms that encourage cause-and-effect reasoning, detailed explanations and precise communication. "We're trying to break the old stigma where workers are paid for their strong backs, not their strong minds," Keenan says (Ibid.).

Apparently, the program is working. At CF's Dallas facility, an EXCEL team reduced damaged and short freight by 34 percent during a nine-week pilot program in which freight handlers were "empowered" to load trucks as they saw fit--without interference from foremen. The load factor at that facility improved between 1000 and 2000 lbs per trailer. (Ibid.)

2. ABF Trucking Company

Several years ago, ABF was contacted by a company that had heard about the carrier's quality process. This manufacturer of playground equipment used a private fleet to haul LTL shipments of its product. But delivering the

equipment was tricky; it had lots of pieces, and it was easy to mix them up or forget one. Consignees included playgrounds or parks where there usually were no receiving docks or experienced receiving personnel. (Gordon, 1991)

Finally the company came to ABF and said it wanted out of the private fleet business. ABF took over the business, and within a short time began outperforming the private fleet. ABF thoroughly trained its drivers to handle the freight and to meticulously check the pieces themselves. After applying careful process analysis, it sent teams of people out to breakbulk terminals to train dock workers on proper loading and inspection procedures for the freight, and began using bar codes to ensure that the right pieces were on the right truck. ABF now has done business with this customer continuously for five years and is the company's exclusive carrier. (Ibid.)

ABF attributes its success with customers like this one to a quality program it put in place nearly a decade ago, when 3M Co. gave a quality seminar for vendors and carriers. "They realized the carrier was a link to their customers," says David Stubblefield, ABF's vice president of marketing. He saw that the quality process could change ABF's culture. "We needed to get away from the regulation mindset, and this was a vehicle to do that," he says. (Ibid.)

Now the carrier's mindset is focused on ideas like constant improvement. This requires a cooperative relationship with the shipper, says Stubblefield,

> We get to the root of the problem, the cause of why we can't satisfy the needs of our customer, and we fix it at once. Sometimes you take non-traditional steps to do that. The answer isn't to raise the price, the answer is to look at the logistics train from start to finish and eliminate handling and time in the cycle. (Ibid.)

3. Yellow Freight

Shippers with clout (i.e. high volume demand) can get what they want, and carriers like Yellow Freight are listening. Roger Payne, director of quality for Yellow, spent four months visiting customers to find out what they want. He learned a lot more than he bargained for because several of Yellow's customers are also developing internal quality improvement programs. (Richardson, 1990, Pg. 19)

Yellow learned from its customers and from external research, but it still had to invent its own quality program because little is available on quality in the service industry, according to Payne. In its quest for quality, Yellow changed internal processes to improve service for the long term. The company recognized that feedback from customers is vital to those employees who deal directly with the customer. Since ongoing communication improves the employee/customer relationship, Yellow implemented a system to improve that communication and build on those relationships. "We bring in customers to talk to our front-line employees about how important it is to get freight unloaded on time, damage-free," says Payne. (Ibid.)

The company found that as employees improved their understanding of customer needs, they were better equipped to improve the level of service. According to one Yellow customer service representative,

> With Total Quality Management and the application of Statistical Process Control, the way I do my job has changed. For example, now I review delivery bills prior to delivery for special requirement. That has dropped my returns from 4.77% to 2.7% per year, representing a savings of about $80,000 per year. (Ibid.)

4. Roadway Express

J.T. Topping, executive vice president of Roadway Express, says his company's quality push began as a pilot program in mid-1984 and became company-wide, through 61 quality teams, in January, 1985. Says Topping,

> Our quality program was originally designed to produce input and ideas from front-line supervisors who are directly involved in prime areas where unquality can be eliminated. Additionally, requirements of customers were changing as they became involved in their own quality programs and we saw the need to be responsive to these changes. (Gallagher, 1988, pg. 115)

Roadway established these goals for its quality teams: improve organizational productivity, improve employee satisfaction, develop employee capabilities through leadership and training, and improve communication by reducing frustration and conflicts. (Ibid.)

In summary, the quality revolution that swept American manufacturing in the early/mid 1980s has now, through a ripple effect, visibly impacted the logistics industry in general and the trucking industry in particular. Increasingly, logistics

quality is seen as a key link in overall quality improvement. Providers of logistical services, particularly motor freight carriers, must either join the "quality fold" or face losing market share to a growing number of aggressive, quality-conscious competitors.

III. MASON TRANSPORTERS AND TOTAL QUALITY MANAGEMENT

A. THE COMPANY

1. History

In pre-World War II America, petroleum products were generally transported by rail. During the war years, however, the federal government prohibited the use of railroad cars to carry petroleum that could otherwise move over the road. R.L. Mason, Sr., then an oil jobber for a major refining company, foresaw an increasing demand for tank-truck carriers. Joining with a partner, Mr. Mason entered the petroleum-hauling business in 1941.

After the war, in 1946, Mr. Mason acquired full ownership of the company, named it Petroleum Transporters, and began a program of steady growth, priding himself on providing professional and dependable service. After obtaining its first chemical authority in 1952, the company changed its name to Mason Transporters and began operating in a second state.

Mason Transporters continued to grow at a measured pace through the 1960s. Operations expanded from Mississippi and Tennessee into Louisiana, Texas, and Alabama through a merger with one tank line and the acquisition of another. The company, now known as Smith-Mason, was the fifth largest tank truck carrier in the nation. In 1968, the company once again

became Mason Transporters, retaining its facilities in Mississippi, Tennessee, and Alabama. Soon afterwards, R.L. Mason, Sr. decided to step down and let his six sons assume guidance of the company.

Expansion continued without hesitation into the early 1980s as the company added sixteen more terminals. In 1981, with the acquisition of a pipeline company in Arkansas, Mason added six more terminals in Arkansas and Louisiana. The company was extended into Georgia in 1983 and into Texas and West Virginia in 1984. In 1985, additional operations were opened in Louisiana and Texas. Then, in 1988, they expanded into New Jersey and in 1989, into Illinois. Today, with 27 terminal facilities, over 600 tractors (both sleeper and conventional), and over 900 trailers, the company is firmly established as a leader in America's tank truck industry.

According to Mason's own official history,

> Year after year, Mason Transporters ranks among the top ten tank truck carriers in the nation, and our reputation for performance is second to none. The secret to our success, however, is really no secret at all. It results from over 40 years of hard work by loyal employees who have established and maintained close, personal relationships with our customers...It results from over 40 years of constant commitment by three generations of the Mason family to the simple philosophy of professional, dependable service begun by R.L. Mason, Sr., when the company was established.

2. Mission

Mason Transporters has a formal "Statement of Mission", which it publishes company-wide. It reads as

follows,

> **Mason Transporters, Inc.**, is recognized nationwide as a leader in transportation and transportation services.
>
> Our mission is constantly to improve our services to meet our customers' needs, allowing us to prosper as a business, and to provide a reasonable return for the owners of our business and continued employment for our employees. (company organizational manual)

As a means of achieving this mission, the company also publishes formal "Guiding Principles" which are as follows,

> 1. Safety: The safety of our employees, the general public, and our customers is always our first priority.
>
> 2. Customers: Customers are the focus of everything we do as a company. Our **Quality** emphasis is directed toward understanding and meeting our customers' needs.
>
> 3. Quality: **Quality** is essential to our success. **Quality** results from constant measurement and improvement of our processes, using Statistical Process Control techniques.
>
> 4. Employees: Employee involvement is our greatest strength. Participation in our **Quality** process includes all employees at every level of the company. Employee training is essential. Our company is committed to training each employee in his or her job requirements, including Statistical Process Control Techniques.
>
> 5. Suppliers: Suppliers are partners in the **Quality** process. Continuously improving **Quality** is attained through a close working relationship between our company and our suppliers.
>
> 6. Integrity: Integrity is never compromised. Our company is conducted in a manner that is socially responsible and complies with the highest standards of ethics.
>
> The Challenge is ours to use these principles as best we can. The rewards are great. We intend to be unsurpassed in our market, but this goal is only possible by all of our company, **Mason Transporters, Inc.**, working toward the same **Quality** goal. (Ibid.)

3. Organization/Structure

Mason Transporters is a privately-held, family-owned business. The offices of President, Chief Executive Officer (CEO), and Chief Financial Officer are held by sons of the founder, R.L. Mason. The Company is organized along functional lines, with line and staff principles strictly followed. According to the company's operations manual, the authority to decide "command and control" is restricted to line management. Staff management is not given this same authority and is limited to making suggestions or recommendations or performing certain services.

a. Line Organization

Line Management for Mason operations (terminals) include:

A. President
B. Vice President--Services
C. Director of Operation
D. Division Operations Manager
E. Terminal Manager or Acting Terminal Manager
F. Other Terminal Supervisors

Authority to decide, command and control on matters relating to all functions or jobs handled at terminal locations rests with either the President, Vice President--Services, Director of Operations, Terminal Manager, or other Terminal Supervisor.

There are 27 terminals located throughout nine states and are organized into divisions based on geographic location.

b. Staff Organization

Staff Departments are formed to assist Line Management in carrying out its functions. This assistance may be in the form of giving technical advice or technical "decision-making" and performance of certain special services, such as accounting or purchasing. In addition, staff departments may formulate overall programs, such as maintenance, and may formulate the policies required to carry the program out. The Staff Departments consist of:

A. Accounting Department
B. Pricing Department
C. Sales Department
D. Personnel and Safety Department
E. Maintenance Department
F. Data Processing
G. Quality
H. Customer Service
I. Telemarketing
J. Accounts Receivable

Most staff function offices are located at company headquarters.

4. Operations

Mason Transporters, Inc. is a common and contract tank-truck carrier which transports various commodities in bulk between points in the United States. The company also holds intrastate authority within Alabama, Arkansas, Louisiana, Mississippi, Texas, and Tennessee. Considered a full-service carrier, Mason hauls a wide range of commodities including chemical products, light oils, asphalts, miscellaneous dry products, miscellaneous liquid products, acids and caustics, fertilizers, compressed gasses, and papermill products.

Mason Transporters' 27 terminals range across several southeastern states, from the Texas Gulf of Mexico to the mountains of West Virginia. Many of these terminals maintain their own complete cleaning facilities, and the others have access to EPA and state approved cleaning facilities. All Mason terminals are interconnected through a computerized system which controls vehicle and parts inventory, equipment matching, long-distance and local dispatch, and communications throughout the entire company.

Mason can move a wide variety of commodities, from hydrochloric acid to corn syrup because it owns a wide range of rolling stock. Mason currently maintains nearly 900 trailers in 16 different categories, including more than 300 stainless steel tanks and over 200 aluminum trailers, as well as pneumatic trailers, asphalt tanks, pressurized tanks,

cement storage tanks, rubber-lined trailers, and dozens of other special-use and general purpose configurations. In addition, there are 600 additional sleeper and conventional tractors for a fleet of 1500 total units.

The fleet receives maintenance support at the various terminal facilities, which have a range of repair capabilities. Mason employs a large staff of mechanics and technicians who repair and inspect all its equipment. All tractors and trailers undergo intensive preventive maintenance inspections at prescribed intervals; additionally, chemical and petroleum tanks are tested especially for safety and product integrity. Mason employs a full-time mechanic trainer who travels throughout the system, keeping technicians current on all maintenance procedures.

B. WHY TQM?

When posed with the question, "Why did Mason implement a TQM program," Mason executives were all in agreement: shippers required it, and the company was in no position to refuse. This was largely due to the intensely competitive nature of the trucking industry in the mid-1980s.

In the early 1980s the external environment dramatically altered the way motor carriers do business. Deregulation removed a blanket of protection and many motor carriers found themselves fighting for survival in an increasingly competitive marketplace. This change is attributed to many

factors: deregulation of private and contract carriers; elimination of barriers to entry, which allowed 8000 new motor carriers to enter the market between 1980 and 1985; increasing use of non-union labor; the ability to obtain dual authority; and competition from a deregulated railroad industry, to name a few. In addition, the power of shippers at the bargaining table increased significantly. Private fleets represented a cost-efficient alternative to common carriers, because after deregulation private fleets could backhaul from unrelated shippers, could haul for affiliated/subsidiary companies, and could lease drivers and equipment to other carriers. Also, many shippers were developing long-term contracts with a smaller number of carriers. (Lambert, Lawrence, Sterling, 1985, pg. 29)

Price competition in the marketplace became severe as a result of excess capacity. Massive discounting of both truckload (TL) and less-than-truckload (LTL) rates became the rule rather than the exception. Many carriers had gone bankrupt since deregulation, while other carriers actively sought ways to improve their efficiency or to re-establish a more competitive position. Motor carriers had to recognize, create, and maintain innovative customer services that differentiated them from competitors. (Ibid.) In 1986, the quality movement sweeping American industry provided just such an opportunity for Mason Transporters.

As executives at Mason see it, formal quality initiatives spread in the trucking industry due to a "ripple effect" from the manufacturing sector, particularly autos. In accordance with basic Deming quality principles, the auto industry demanded that their suppliers, the chemical companies, provide quality products, who in turn demanded that their suppliers (transport service companies), provide a quality product, i.e., service. As the quality movement spread in the chemical business, companies such as Exxon Chemical, Dupont, and Union Carbide began reducing their number of carriers and forming partnerships with only a few carriers. Since over 50 percent of Mason's business was with large chemical concerns, it was just a matter of time before one of their larger clients brought up the subject of quality.

C. IMPLEMENTATION OF TQM AT MASON

In 1986, senior Mason management executives were invited to a quality seminar sponsored by Exxon Chemical of America. During that seminar, an Exxon executive announced that they would soon move away from vendors (carriers) that did not have formal quality programs. Since Exxon makes up about 12% of Mason's business, company officials took this very seriously and began a search among the various alternatives (Deming, Crosby, Juran, etc.) for the quality program that would be most effective. Mason management eventually decided that the Deming Management Method was best suited to existing company

culture due to its more quantitative approach (as opposed to the relationship orientation of Crosby).

As a first step in their implementation of a quality program, Mason executives trained themselves in "the new philosophy" of quality management. To do this, they turned to QUALPRO, a quality consulting agency which teaches the Deming management methods. Next, they brought in a quality consultant, a business professor at a local college with some expertise and experience in quality program implementation. A Quality Steering Committee (QSC) was formed made up of the President, Vice President of Services, Assistant to the President, Vice President of Finance, Director of Personnel, Director of Maintenance, and Director of Operations. Every member of the QSC went to a QUALPRO seminar for training in the Deming management method. As a foundation for the new quality program, company "guiding principles", a mission statement, and 10 implementation objectives were formulated. Next, an in-house quality training curriculum was developed (with the help of the consultant) which was structured as follows: **Level 1**--introduction to basic quality philosophy, 7-step problem-solving cycle, and basic problem-solving tools; **Level 2**: how to use the problem-solving tools, the 80/20 rule, control charts, etc.; and **Level 3**: indepth study of statistical theory behind the problem-solving tools. Each level consisted of a four-hour block of training. The consultant trained most of middle management personnel

(terminal managers, staff managers, sales people, etc.) during the summer of 1988.

Meanwhile, shippers were becoming increasingly quality-focused, demanding more detailed and statistically based delivery performance reports. At this point, Mason decided to establish a full-time Quality Manager to oversee implementation of the quality program and to ensure customers received the quality data reports they required. A current Miller employee, the Assistant Director of Safety, was selected for the position due to his mathematical background, interpersonal skills, and familiarity with computers. A recent college graduate, he had been with the company for about two years and had no previous experience with quality other than company training. His two-year tenure included one year as a terminal dispatcher and one year as Assistant Director of Safety.

The Quality Manager (QM), filled a staff department head position and reported to the Vice President of Services. The QM's job was to: (1) "See that quality improvement concepts are understood by the employees and management," and (2) "Help implement practices that will improve the quality of Miller transporters as a company." Specific duties included:

1. Aid in the transformation of management philosophy using Deming's fourteen points.

2. Help to create and maintain partnership with customers and suppliers.

3. Train personnel in the use of problem solving tools.

4. Help develop new and better tools for problem solving and improving for quality.

5. Work to improve quality in specific processes within the company.

To prepare himself for the job, the Quality Manager (QM) immediately attended a QUALPRO seminar (he later attended a four-day Deming seminar). The QM chaired the QSC meeting which continued to meet once a month.

Mason decided to train all non-management personnel utilizing "in-house" resources. To accomplish this, 14 middle managers were selected as trainers, and these personnel were added to the QSC (as a result, QSC meetings became rather unwieldy due to their large size, and became increasingly contentious). The 14 quality trainers were divided into 7 teams. The teams traversed the company's regional operating areas and provided level 1 training sessions to all "rank-and-file" employees. Unfortunately, not all quality trainers were equally motivated and there was some footdragging. Typically, the more "zealous" members took up the slack for those who were less enthusiastic. Nevertheless, all level 1 training was completed well within the established six-month milestone. Ongoing training for new hires at the Owner-Operator School at company headquarters was also the responsibility of the 14 quality trainers.

Encouraged by the relatively successful training effort thus far, the QSC turned its attention to application. To that end, Corrective Action Teams (CATs) of six members each

were established at each of the 27 terminals. In theory, these teams provided the structure for front-line implementation of the quality program. The original mission for these teams was to increase productivity by using the seven step problem solving cycle to resolve quality problems. All CAT members received level-2 training directly from the quality consultant. The 14 former quality trainers, now called "Quality Team Coaches" served as facilitators for the CATs. The CATs met weekly and sent meeting minutes to the Quality Manager who, functioning as an overall coordinator, shared information and lessons learned between teams. The QSC did not dictate specific problems to be addressed by the CATs believing that to do so would inhibit intrinsic motivation and empowerment. Additionally, the specific organizational relationship between the CATs and the existing management structure was not addressed.

In the fall of 1989 the quality movement among shippers continued unabated; in line with quality management thought, they were aggressively reducing their number of (vendors) carriers. At this point, Mason's adoption of TQM is paying handsome dividends, at least from the standpoint of maintaining its customer base. Several large chemical shippers recognized Mason as a carrier that was serious about its quality program and were, therefore, developing even stronger ties to the company.

The CATs were performed fairly well through the fall of 1989 and early 1990. However, the teams soon began to have problems and lose momentum for several apparent reasons. Drivers were often on the road and couldn't make the meetings, adversely affecting continuity. Also, due to the extensive travel requirements, sometimes coaches couldn't make it to the meetings; and, some were just not interested. Gradually, the coaches became less and less involved with the teams. Most importantly, however, as the teams came up with proposals to solve problems, it became clear that there was no real plan (or authority) to implement those changes. So, in some instances, arose a conflicts arose between the teams and middle management which were never successfully resolved. Accordingly, the teams slowly became less and less active and eventually died out completely. Meanwhile, the Quality Manager was busy working with shippers who required regular meetings to discuss service problems and customer satisfaction issues. It was during this time that the Quality Manager gradually shifted gears from being a quality coordinator (through the CAT's) to being a quality "special projects" person. Somewhat frustrated by the lack of progress with the CATs, he tried to do what he could to implement some of the fourteen points on his own.

Also at this time, the President of the company, realizing that the quality program had lost momentum, directed the QSC to perform an indepth study of the fourteen points to develop

a better understanding of how to more practically apply Deming's theory in the company. Unfortunately, nothing really came of this and the company continued to have problems making practical application of TQM. One of the central issues throughout the quality program implementation was how the organization of the company would be affected (if at all) by the new quality program.

In 1989, the company suffered a significant operating loss for the year and, in an effort to reduce costs, began a major downsizing effort. This fiscal crisis served to draw attention away from quality concerns as the company struggled to improve its profitability. The frustration experienced with the somewhat erratic implementation of the quality program, the heavy financial loss, and a disappointing experience with a management consulting group served to lower moral and erode management credibility. It seemed as though an attitude of, "well, quality didn't work, lets go back to the old way" set in.

In 1990, the company went through a cost cutting program characterized by layoffs, early retirements and reprioritizing expenses. In the midst of this crisis, the company implemented a comprehensive business planning process. The quality consultant became very involved with this effort and, sensing a change in management focus, became increasingly detached from the "quality program". Given the company culture and financial circumstances, he viewed this as a more

appropriate course of action than the classic type of quality program originally envisioned.

As part of the corporate planning process, cross-functional teams were developed to evaluate where the company was with regard to its mission statement and guiding principles. These cross-functional teams developed a plan to best meet the guiding principles and submitted 53 suggestions to the executive committee. With cost control taking on new urgency, the corporate planning process became the primary means of making improvements in the company (as opposed the quality program).

In summary, while in the 4th quarter of 1989 there were from 22 to 26 quality CATs meeting regularly, in the 1st quarter of 1992 there were none. In the 4th quarter of 1989, top management spent at least 1.5 hours per week devoted to structured "quality activities" such at CAT meetings, QSC meetings, and 14-point study groups; in the first quarter of 1992 there was no such activity by upper management. Essentially, there has been no organizational changes made in the company as a result of the quality program other than the creation of the Quality Manager position. Furthermore, there has been no substantial change in company policy as a result of CAT-recommended process changes/improvements.

On the surface, it seems that the formal quality program at Mason peaked in mid-1989, and then slowly lost its effectiveness. Whether this is true, and if it is, why it

happened will be examined more closely in the next chapter.

IV. DATA ANALYSIS

A. THE DATA

This chapter will evaluate the effectiveness of Mason's TQM implementation effort, and discuss the relative strengths and weaknesses of the program. Obstacles to implementation success will be highlighted.

It should be apparent to the reader that gauging the "success" or "failure" of a quality program within a company would be a difficult task indeed. There is no yardstick, or objectively measurable criteria which will identify any one such program as "good" or "bad," and that is certainly not the objective of this research effort. Rather, this study seeks to determine how completely Deming's fourteen points have been adopted and incorporated into the "working culture" of the company. At the heart of this analysis lies the question, "What do the employees say?"

In assessing "implementation effectiveness," a framework was necessary to structure the data collection effort and subsequent analysis. This framework involves certain "critical areas" of company management in which the core values and concepts of Total Quality Management are embodied. The analysis will center on five such critical areas. They are as follows:

1. Leadership. How committed is top management to the quality program? Are they symbolically and actively involved?

2. Strategic Quality Planning. Is there a recognition (by all employees) that quality improvement is a long-term commitment of resources upon which the company's survival depends? Is the "quality plan" incorporated into the "business plan?"

3. Human Resource Development and Management. Does employee empowerment really exist? Can front-line employees act in the interest of customers without getting prior approval? Are education and training programs effective?

4. Management of Process Quality. Is quality improvement viewed in terms of "process thinking?" Have processes been mapped out, measured, and controlled through statistical methods?

5. Communication. When things go wrong, are employees punished, or do they receive coaching and support? Is personal initiative valued or feared? Are lines of communication open, both up and down the chain of command, and between departments?

[Four of these critical areas were borrowed from the 1992 Baldrige Quality Award examination process in which they are referred to as "quality criteria." (The Malcolm Baldrige National Quality Award is intended to promote quality in the U.S. business community and is administered by the U.S. Commerce Department. Entrants are judged by recognized quality experts selected from industry and government using seven quality criteria as a way to measure adherence to accepted quality principles.) A similar idea is introduced by Saraph, Benson, and Schroeder in "An instrument for Measuring the Critical Factors of Quality Management." In

that paper, eight "critical factors" (which are similar, but not identical to the Baldrige criteria) are described which can be used as a measure of company-wide quality management.]

Another obviously important area, communication, was added in this study for a total of five critical areas to be examined. Appendix A shows, for purposes of this study, how each of the fourteen points have been grouped into one of the five critical areas.

The analysis of Mason's TQM program will be made based upon these five areas utilizing data gathered by three methods: observational, personal interviews, and survey questionnaire.

1. Observational

The researcher spent five days "on-site" at Mason Transporters, Inc. observing company operations, reviewing records, and informally talking to company officials and employees. The purpose of this visit was to appraise the degree and effectiveness of company-wide TQM implementation. A significant portion of this time was spent with the Quality Manager as he reviewed the company's quality program and described its implementation into day-to-day company operations. Observation and review focused primarily on the five critical areas of company management. Appendix B breaks down the five critical areas into a number of more narrowly focused questions which were used throughout this

observational/review process. Notes were maintained with pertinent data, observations, and subjective judgements meticulously recorded. This information will be utilized primarily in Section C (Discussion) of this Chapter.

2. **Formal Interviews**

In addition to ongoing discussion with Mason's Quality Manager, and informal talks with Mason executives and employees, formal personal interviews were conducted with selected executives. Eight managers were judgementally selected based on how long they had been with the company and to what degree they were involved with the quality program. All participants were asked the same ten questions on an anonymous basis in a closed-door setting. The questions and responses are presented below. After a very brief consolidation/summary, selected responses are quoted which were deemed (by the researcher) to present different perspectives and unique insights. Some of the responses will be used to support conclusions presented later in this chapter. Questions and responses from the personal interviews follow:

1. What led management at Mason to pursue a quality program?

There was no doubt among any of the respondents that Mason's TQM effort resulted from the demands of customers; i.e., the impetus came from <u>outside</u> the company. Furthermore,

due to the competitive nature of the trucking industry at the time, Mason could not ignore this demand and remain a viable company for long. This topic was covered in some depth in Chapter 3, and will not be repeated here.

2. When that decision was made, what was the competitive environment in the trucking industry like?

The competitive environment was very intense. Deregulation was bringing the full force of competition to bear on the company and, as a result, there was a great struggle to remain profitable. Fiscal austerity and corporate downsizing were the order of the day. This topic was also covered in Chapter 3.

3. Has the quality program at Mason been a success?

Almost across the board, the answer to this question seemed to be "yes and no". "Yes," because almost all interviewees felt the company had benefitted from TQM, "No," because they all recognized the process had not come to full fruition. Some expressed frustration that employee empowerment to make changes at the worker level never developed, and that a full-fledged implementation of the fourteen points was not achieved. Others stated that SPC (Statistical Process Control) was never really put to use within the company. On the other hand, many argued that the whole TQM process gave middle management more influence in

deciding the direction of the company, forever changing the relationship between middle managers and top-level executives.

Some typical responses to question (3) include:

> Yes (TQM was a success), but it did not move fast enough. The (corrective action) teams were great at finding problems and recommending solutions, but implementation was "zip." Statistics have been useful in identifying problems and inefficiencies, and even useful in identifying workers who needed to be fired.

> Not really, not now anyway. It was an uphill process from the very beginning. Unfortunately, we got the cart before the horse. We went to tremendous expense training all of our people, but we never really convinced the corporate executives that change was needed. It is very hard to change a small family-owned business--the old ways of doing things are very deeply ingrained.

> Yes, although it (TQM) has not developed as originally envisioned. There has been a measurable change in the attitude or cultural climate of the company due to an awareness of the fourteen points. For example, when decisions are made by management, and plans are formulated, the Deming management method certainly comes into play. People ask, "Is it the Deming way?"

> Yes, in places. We don't live it day-to-day, and by-in-large, customers don't care. Only the "biggies" are concerned about it. It's kind of hard to get excited about it when the customer doesn't even know what you are talking about. We probably got into this too quickly--training everybody at once. Besides, we've always been a quality company.

> The confidence in us by our shippers/customers has been strengthened. When we need improvement, we know what to do. It helps us know where we stand with our shipper/customer. More team effort throughout the company exists. Many barriers have been broken down--but, more effort needs to be made here.

4. What are some obstacles Mason encountered during its implementation of a quality program?

The most commonly mentioned obstacle was, not surprisingly, resistance to change on the part of individuals who had been with the company for a long time. Closely tied to this was the reluctance of certain people in top management to relinquish power. Some responses to question (4) include:

> Having to train everybody was a tremendous task, both in time and in money. It was very hard to keep people sold on the idea. The wide dispersion of the company over such a wide geographic area made training especially difficult.
>
> Corporate executives were not convinced. How can you change the company when some key management people are not even interested in the program! Resistance to change was just too ingrained.
>
> One of the most significant obstacles was corporate culture. Significant change was never really necessary in the company we grew up in; now that we have to change, it's not so easy.
>
> Well, some people just don't want you messing on their turf, so to speak. The old story, resistance to change. This leads to stalemate and power struggle, which results in no action, which leads to discouragement. Another obstacle is how spread out the company is. It's just hard to get everybody trained and speaking the same language in such a geographically dispersed organization.
>
> We struggled hard to apply the theory. Most of the training dealt with manufacturing, not service. We didn't really know what we were doing.

5. How has the quality program at Mason evolved since its first introduction?

The general consensus was that the quality program had started out "like a ball of fire" and from there slowly lost its momentum. There was a feeling that when top management realized what drastic change was necessary to truly implement TQM, they backed off from the plan. Some typical responses to

question (5) include:

It (TQM program) is certainly much more realistic. The bottom line is profit. You can have the best quality program in the industry, and develop quality partnerships with industry, but the little guy (with no quality program) can still cut you out of the picture in a heart beat with cheaper rates. So, unfortunately, the partnership idea seems to work only to the benefit of the shipper.

I would say that the quality program was successful at one time; we got three quarters of the way there, but then started sliding backwards and now we seem to just be idling

We used to meet a lot (to discuss quality issues), but not anymore; probably met too much--the corrective action teams sat around and dreamed up problems.

We now realize that the theory is the most important part. You must change the way people think--you know, "adopt the new philosophy"--and that is very, very difficult. A slow process.

After we attended our first QualPro school, we thought we had learned everything we needed to know. By the time we got back and started trying to implement a program, we found we really didn't know where to begin. After much searching, we found a consultant who has held our hand throughout the implementation process.

The TQM program has been like a rollercoaster. We were very excited at first, but now everyone is pretty blase about the whole thing. The quality coaches at the terminals did not really take their jobs seriously.

TQM was intended to be a company-wide program, but it evolved into a program that is centered and active in the corporate offices only under the direction of the Quality Manager. It evolved into a staff function, rather than a line function.

6. Do you feel as strongly now about the need for a quality program as you did when it was first started?

Almost all interviewees responded in the affirmative to this question, although a few expressed some reservations.

They seemed to say that while there was clearly some merit in TQM, if the company had the chance to do it over, some things should be changed. A few responses to question (6) include:

> Yes but now I look at it (TQM) differently. Back then I viewed it as something that was separate from the job, but now I realize that it all must be looked at together. For example, I looked at dispatching and quality reports as two separate things. Also, I think it was a mistake to have the CATs look into problems of their own choosing; often they would spend a lot of time on a problem, only to find that management viewed the problem as unimportant and the whole effort became a waste of time.
>
> I have mixed emotions about it. It could work if we were truly committed to it; but, then again, we did fine without it. Its important for the customers who want it, but most don't.
>
> I feel strongly that we should continue to provide quality service to all customers--inside and outside (of the company) customers. At this point we probably need to emphasize more leadership within the departments, rather than just having someone responsible for the quality program.
>
> Absolutely. Nothing has changed. We must compete with on-time, quality performance or this company won't be here three years from now.

7. What is the relationship between the company's quality program and the corporate planning process?

Responses to this questions varied considerably. Some thought they were one and the same, others said there was little connection between the two. Some responses to question (7) include:

> The corporate planning process is an extension of the quality program. They really cannot be separated.
>
> The whole corporate planning process was designed with Deming in mind. It is another slant on participative management, but the scope is more long range and deals

with specific issues related to the mission statement (customer service, growth, profit, etc.) Similar to the CATs, but more strategic in scope.

The corporate planning process is essentially CATs planning for the long-term using Deming's problem solving tools.

The company quality program is a day by day process--has long and short term goals. The corporate planning process deals more with long-term goals of company.

To some extent, the corporate planning process preempted the quality program. It was a way around the quality program to push decision-making authority down to lower levels.

8. Do you feel that a vigorous quality improvement program is essential to survive in today's trucking environment?

Most, but not all, answered this question in the affirmative. Some responses to question (8) include:

I'd like to say yes, but the little guy with low rates and no quality program is killing us. Shippers keep talking about quality, but it is obvious that "rates do the talking.

Not really. Without doubt, shipper interest in quality is waning. In fact, it now seems that quality was just another fad among shippers and the primary interest now seems to be shifting to hazardous response capability.

Absolutely. As strong as the demand is for quality-type programs, I can't imagine anyone without one generating business.

It depends upon which area of trucking you are talking about. You have to understand that at Mason, and probably other full-service carriers, the chemical business is on the rise and the petroleum business is on the decline. Typically, the petroleum people are totally clueless with regard to TQM; the chemical people, on the other hand very much speak the language.

9. **What is unique about the trucking industry that makes implementing a quality program especially difficult?**

A variety of opinions was expressed. Responses to question (9) include:

> The way it (the company) is spread out over a wide geographic area. This makes it difficult to communicate, provide training in quality, and follow-up on quality initiatives.
>
> It's is not really all that different. The most difficult part is not having a tangible product that you can feel and measure.
>
> In trucking, there are so many variables not in your control. It's hard to identify sources of variation. Once a truck leaves the dock, who know what can happen...adverse weather, bad road conditions, poor driver performance, just to name a few.
>
> All of the rules and regulations we have to follow.
>
> Almost nothing. We are just not used to operating in a competitive environment due to decades of regulation.

10. **What "lessons learned" do you have for other companies interested in developing a quality program?**

Although there were a variety of answers to this question, one fairly consistent theme surfaced--the importance of top management involvement in the quality program. Some responses to question (10) include:

> Very top management (corporate board of directors) must be completely sold and thoroughly trained. Make sure they are completely sold. The program must flow from top management. In this company, the Masons were never really sold. As a result, those who believed in the quality program were put in the compromising position of telling people change was really going to happen, when in fact it never did (because top management didn't really want it to). Top management must be 100% committed.

There is no recipe for success, every company is different. Trial and error is the only way. Just get in there and do it, but you must believe in it or it will never work.

Take it slow. Start at the top and work down, not vice versa. We had too many CATs trying too much, too quickly. Don't jump in with both feet.

Thoroughly train a few employees. Hire someone to hold their hands. Go slow. Educate the employees. Start from the top and work down. Know your company's corporate culture and work from there.

First, spend some time with management, observing the corporate structure to determine if there is a "shared-responsibility culture." If there is not, forget it. TQM will simply not work in a "top-down" organization. The organization must be "flattened" first. Secondly, management must be prepared for what will be expected of them. TQM and a 'business as usual' attitude just don't mix. You're wasting your time.

TQM is worthwhile to some extent, but it can also be a "bill of goods." One thing's for sure, quality is not free! That's a joke!

You don't need to rush in with lots of (quality) training to the guy at the bottom. Start at the top and go down gradually, level by level. We trained our lower-level employees when middle management was never really on board.

3. Survey Questionnaire

The very subjective nature of determining how effectively TQM was implemented in Mason has already been discussed. The survey questionnaire endeavors to make this process somewhat more objective by obtaining quantifiable data which can be observed empirically.

To that end, a 34-question research instrument was designed. The survey measures the degree to which Deming's principles have been incorporated within the company's

structure and culture. Each question, or statement, addresses a particular Deming principal. Using a Likert Scale, the respondent expresses his relative agreement or disagreement by selecting one of the following choices: (1) strongly disagree, (2) somewhat disagree, (3) indifferent, (4) somewhat agree, (5) strongly agree. Each question is considered separately and the mean score for all respondents is computed. The higher the score, the higher the degree of TQM implementation effectiveness. For those questions stated negatively, the responses have been "reversed," (i.e., a 1 becomes a 5, a 2 becomes a 4, and vice versa). Questions 6, 11, 13, 18, 20, 21, 22, 23, 24, 30, and 34 are such questions. In this way, a consistent scoring system (where higher numbers are better) is maintained for all questions.

The survey was administered to a simple random sample of 60 Mason employees drawn from a population (frame) of all Mason employees. A statistical software package, Minitab, was utilized to generate 60 randomized integers from the integer set 1 to 1056. These random numbers were then used to select 60 employees from a company-generated employee listing of 1056 persons. The sample was not stratified, and all Mason employees--management, hourly workers, and drivers--were equally likely to receive a survey. The survey was administered through the U.S. mail and was not connected with the author's on-site visit to the company in any way.

The home addresses of the employees selected to participate were provided by the company. A package consisting of a letter of introduction, detailed instructions, the two-page questionnaire, and a pre-stamped, self-addressed envelope were mailed from the Naval Postgraduate School. Duplicate follow-up packages, including an additional letter encouraging participation, were mailed out 19 days after the first mailing. Of the 60 questionnaires mailed, 3 were undeliverable and returned unopened, 34 were returned complete, and 24 were not returned. Considering only those employees that actually received a survey, this yields a response rate of about 60 percent (34/57).

The survey questionnaire is an especially important facet of this analysis for three reasons. First, as already mentioned, it provides a degree of objectivity not otherwise available. To a certain extent, the "numbers can speak for themselves." Secondly, the results reveal direct, unfettered input from employees at all levels of the company. In any quality program, this is where "the rubber meets the road," so to speak. A quality program can look good on paper, and management may be able to talk a good story, but if the program is not viable and practical where rank-and-file employees work and interact, it is useless. Thirdly, the data obtained is highly credible. As administered, the survey questionnaire was strictly anonymous, allowing each respondent provide his true feelings, unclouded by fear of retribution or

desire to impress which can be present in the personal interview situation.

The survey questions, with mean scores, are presented in Appendix C.

B. ANALYSIS

This section will examine data from the survey questionnaire to define areas of TQM implementation where Mason has been most successful, and, on the other hand, those areas where they have not been as successful. Specific questions are extracted from the questionnaire to indicate implementation effectiveness in the various Deming principles. Those Deming principles, in turn, are grouped within the five critical management areas already described. Because many of Deming's points are closely inter-related, some survey question apply to more than one point, and are therefore used more than once. Also, not all of the survey questions are used.

Before proceeding, two points should be made. First, the objective in this analysis is not to obtain "yes/no" answers, but to find general trends of strength and weakness with regard to TQM implementation. Neither are the conclusions reached in this section "the last word," as other data is available (from personal interview and observation process) which may conflict (or corroborate) the conclusion drawn here from the survey results. These issues will be dealt with in

section (C) of this chapter, "Discussion." Secondly, a fundamental assumption made in the survey is that what the employee "feels" is basically factual in reality. For example, if the employee thinks that top management is supportive of TQM (whether they are or not), than for the purposes of this analysis, they are. (Conceivably, the employees could have been "fooled," but this is considered unlikely enough to be discounted).

A simple scoring system is used to aid in the analysis of the survey data. It is as follows:

Score	Evaluation of Implementation
5.00-4.50	Extremely effective
4.49-4.00	Very effective
3.99-3.50	Moderately effective
3.49-3.00	Somewhat effective
2.99-below	Less than effective

This evaluation system can be applied to each question individually, or to the average score obtained from 2 or more questions which apply to the same Deming principle.

1. Leadership

The following Deming points apply to the critical area of leadership:

a. Point Two: Adopt the New Philosophy

Dr. Deming says:

> Point two really means in my mind a transformation of management. Structures have been put in place in management that will have to be dismantled...We will have to undergo a total demolition of American style of management... (Walton, 1986, pg.59)

Survey questions related to this point are as follows:

- (3) Top management is committed to the Quality Program in this company. (score=4.50)
- (16) This company is prepared to make the drastic changes necessary to implement a true quality program. (score= 4.24)
- (20) All the talk about the need to improve service quality is nonsense; if we weren't doing things right we wouldn't be in business today. (score 4.44)

The mean score for these three question is 4.41. Hence, the company is evaluated as "very effective" in implementing Deming's Point Two.

b. Point Seven: Institute Leadership

Dr. Deming says:

> People come into a company from college, learn about the company by going in and being supervisors somewhere. Pity poor people that have such supervision. No help at all! Aren't they entitled to some help? Where is the supervisor who knows how to find who is in need of individual attention? Show me one. There is no such thing as supervision, and should not be, unless people know how to supervise. (Ibid., pg. 71)

Survey questions related to this point are as follows:

- (18) I learned how to do my job from fellow workers. (score=2.41)
- (19) My supervisor has a good handle on what my job is really all about. (score 4.03)
- (28) My superior(s) lead by example; they don't just tell me what to do, they get out their and do it themselves. (score=2.56)

The mean score for these three questions is 3.00. Hence, the company is evaluated as "somewhat effective" in implementing Deming's Point Seven.

c. Point Eleven: Eliminate Numerical Quotas; Substitute Leadership.

Dr. Deming maintains that quotas or other work standards impede quality perhaps more than any other single working condition. He says, "I have yet to see a work standard that includes any trace of a system which would help anyone do a better job." Indeed, as work standards are generally used, they guarantee inefficiency and high cost. (Ibid., pg. 78) Survey questions related to this point are as follows:

- (13) This company is more interested in meeting numerical goals and targets than in "continuous improvement." (score=3.88)
- (24) My supervisor wants the job done quickly, not properly. (score=4.35)
- (30) My job performance is evaluated through the use of production quotas, or numerical goals of some type. (score=2.88)

The mean score for these three questions is 3.70. Hence, the company is evaluated as "moderately effective" in implementing Deming's Point Eleven.

2. Strategic Quality Planning

Deming's Point One is applicable to the critical area of strategic quality planning:

a. Point One: Create Constancy of Purpose for the Improvement of Service.

Dr. Deming says:

People are concerned about the future, and the future is

ninety days at the most, or nonexistent. There may not be any future. That is what occupies people's minds. That is not the way to stay in business. Not the way to get ahead. You have to spend some time on the future. And to put it off--"Nothing could happen today anyway. Could just as well put it off another day, another week, no harm done because nothing would happen anyway today." So you put it off and put it off and nothing happens. (Ibid., pg. 57)

Survey questions related to this point are as follows:

- (7) I am familiar with this company's "statement of mission" and its guiding principles. (score=4.32)
- (8) This company must continually improve its service to customers; "business as usual" simply isn't good enough in today's competitive environment. (score=4.94)
- (10) The future of this company depends upon our ability to provide ever-increasing excellence in our customer service. (score=4.97)

The mean score for these three questions is 4.74. Hence, the company is evaluated as "extremely effective" in implementing Deming's Point One.

3. **Human Resource Development and Management**

The following Deming points apply to the critical area of human resource development and management:

a. Point Six: Institute Training on the Job

William W. Scherkenbach, a long-time follower and protege of Dr. Deming says:

> Changing company systems alone will not assure continuing improvement. We must recognize a continuing training and education commitment to all employees. To put it in perspective, many of our Japanese competitors provide at least one year of training before they give anyone sole responsibility for a job. This training goes a long way towards ensuring that the employee fully understands his total job, the policies of the company, and his customers' and suppliers needs. (Scherkenbach, 1986, pg. 91)

> Part of creating the environment for continuing improvement is to provide all employees with a broad understanding of statistical thinking and statistical methods. These are powerful tools in helping identify action opportunities for continuing improvement. Management especially needs these tools to effectively manage their organizations. (Ibid., pg. 95)

Survey questions related to this point are as follows:

- (15) This company is serious about job training. (score=4.35)
- (26) I have received training in Statistical Process Control (SPC) including the use of control charts, flow diagrams, pareto diagrams, and other tools of statistical analysis. (score=3.32)
- (32) I have received sufficient training to do my job. (score=4.50)

The mean score for these three questions is 4.01. Hence, the company is evaluated as "very effective" in implementing Deming's Point Six.

b. Point Thirteen: Institute a Vigorous Program of Education and Self-Improvement

Dr. Deming says:

> How do you help people improve? What do you mean by improve? If you ask me, I would say that I find a general fear of education. People are afraid to take a course. It might not be the right one. My advice is take it. Find the right one later. And how do you know it is the wrong one? Study, learn, improve. Many companies spend a lot for helping their people in this and that way. In arithmetic, geology, geography, learning about gears....Help people to improve. I mean everybody. (Walton, 1986, pg. 85)

The only question related to this point is:

- (17) This company is interested in my well-being and professional development. (score=3.82)

The score for this question is 3.82. Hence, the company is

evaluated as "moderately effective" in implementing Deming's Point Thirteen.

c. Point Twelve: Remove Barriers to Pride in Workmanship

According to Scherkenbach, there are a host of systems (not specifically covered by other points) that inhibit continuing improvement. Chief among these are daily production reports and performance appraisal methods. (Scherkenbach, pg. 47) Survey questions related to this point are as follows:

- (13) This company is more interested in meeting numerical goals and targets than in "continuous improvement." (score=3.88)
- (25) My supervisor is interested in removing those barriers that keep me from doing a good job. (score=3.71)
- (24) My supervisor wants the job done quickly, not properly. (score=4.35)
- (30) My job performance is evaluated through the use of production quotas, or numerical goals of some type. (score=2.88)
- (31) I feel free to talk to my superiors that interfere with the quality of my work. (score=4.24)

The mean score for these five questions is 3.81. Hence, the company has been "moderately effective" in implementing Deming's Point Twelve.

4. Management of Process Quality

The following Deming points apply to the critical area of managing process quality:

a. Point Four: End the Practice of Awarding Business on Price Tag Alone.

Dr. Deming says:

> Price has no meaning without a measure of the quality being purchased. Without adequate measures of quality, business drifts to the lowest bidder, low quality and high cost being the inevitable result. American industry, and the U.S. Government, civil and military, are being rooked by the rules that award business to the lowest bidder. (Deming, 1982, pg. 32)

Survey question (22) is related to this Point:

- (22) When this company buys equipment, supplies or services, price rather than quality is the primary consideration. (score=3.59)

The score for this question is 3.59. Hence, the company is evaluated as "moderately effective" in implementing Deming's Point Four.

b. Point Five: Improve Constantly and Forever the System of Production and Service

Dr. Deming says:

> Putting out fires is not improvement. Finding a point out of control, finding the special cause and removing it, is only putting the process back to where it was in the first place. It is not improvement of the process.
>
> You are in a hotel. You hear someone yell "fire." He runs for the fire extinguisher and pulls the alarm to call the fire department. We all get out. Extinguishing the fire does not improve the hotel. That is not improvement of quality. That is putting out fires. (Walton, 1986, pg. 67)

Survey questions related to this point are as follows:

- (10) The future of this company depends upon our ability to provide ever-increasing excellence in our customer service. (score=4.97)

- (8) This company must seek to continually improve its service to customers; "business as usual" simply isn't enough in today's competitive environment. (score=4.94)

- (21) I am too busy "putting out fires" to think about how the quality of my own work can be improved. (score=4.24)

The mean score for these three questions is 4.72. Hence, the company is evaluated as "extremely effective" in implementing Deming's Point Five.

5. Communication

The following Deming Points apply to the critical area of communication:

a. Point Nine: Break Down Barriers Between Staff Areas

Dr. Deming tells this story:

> A new president came in, talked with the head of sales, design, manufacturing, consumer research, and so forth. Everybody was doing a superb job, and had been doing so for years. Nobody had any problems. Yet somehow the company was going down the tubes. Why? The answer was simple. Each staff area was suboptimizing its own work, but not working as a team for the company. It was the new president's job to coordinate the talents of these men for the good of the company. (Deming, 1982, pg. 62)

Survey questions related to this point are as follows:

- (5) Teamwork is lacking in this company; the operating philosophy seems to be, "every man for himself!" (score=3.47)

- (14) Management does a good job in helping different staff areas work together. (score=3.71)

The mean score for these two questions is 3.59. Hence, the company is evaluated as "somewhat effective" in implementing Deming's Point Nine.

b. Point Ten: Eliminate Slogans, Exhortations, and Targets for the Work Force

Dr. Deming says:

> A quota is a fortress against improvement of quality and productivity. I have yet to see a quota that includes any trace of a system by which to help anyone to do a better job. A quota is totally incompatible with never-ending improvement. There are better ways. (Ibid., pg. 71)

Survey questions related to this point are as follows:

- (13) This company is more interested in meeting numerical goals and targets than in "continuous improvement." (score=3.88)
- (30) My job performance is evaluated through the use of production quotas, or numerical goals of some type. (score=2.88)

The mean score for these two questions is 3.38. Hence, the company is evaluated as "somewhat effective" in implementing Deming's Point Ten.

c. Point Eight: Drive Out Fear

Dr. Deming says:

> No one can put in his best performance unless he feels secure. "Se" comes from the Latin, meaning without, 'cure' means fear or care. "Secure" means without fear, not afraid to express ideas, not afraid to ask questions. Fear takes on many faces. A common denominator of fear in any form, anywhere, is loss from impaired performance and padded figures. (Ibid., pg. 59)

Survey questions related to this point are as follows:

- (34) When things go wrong, management usually looks for someone to blame it on. (score=3.41)
- (1) My supervisor is more of a coach than a "boss"; is a source of encouragement and support. (score=3.88)
- (11) My supervisor is just waiting for me to screw up so he can nail me. (score=4.15)

- (12) I feel free to express ideas to me supervisor about how to make improvement in my area of responsibility. (score=4.38)

The mean score for these four questions is 3.96. Hence, the company is evaluated as "moderately effective" in implementing Deming's Point Eight.

C. DISCUSSION

This section continues the analysis of TQM at Mason using information and insights gained from all three research methodologies (observational, formal interviews, and survey questionnaire). Those dimensions of quality program implementation which the researcher found particularly noteworthy will be highlighted. In general, strong points and weak points of the implementation process will be discussed, once again within the context of the five critical areas of quality management.

1. Leadership

The fact that leadership is critical to the successful implementation of TQM seems patently obvious. Indeed, any attempt to bring about organizational change of the magnitude demanded by Deming without the unmitigated support of top management is doomed to failure. Top leadership must lead the quality improvement process actively and demonstrate a strong and sustained commitment to it. Without patience, persistence, and consistency, employees will view the change process as just another "program of the month" (Cornell,

Herman, 1989, pg. 56). In a recent meeting of the American Management Association Council, one central thought that emerged from a discussion on the practical aspects of quality program implementation was,

> Quality starts at the top. Senior management must display solid support for the movement and the 'vision' to keep it moving. (Management Review, 1991, pg. 30)

In this area, Mason was particularly effective, as survey questions (3) and (16) indicate. The high scores on these questions reveal that most employees view the quality program as having substance and staying power, and not as just another "program of the month."

Interestingly, the opinions of many middle managers gleaned from the formal interview process tell a different story. Among many of these lower-level executives, the feeling seemed to be that while top management was sold on the idea of TQM originally, they had later backed off when they saw the extent of organizational change required to make it work. Said one manager, "They (top management) were willing to let us make changes in the way we wash tanks, but not make the structural changes in the company to truly empower employees." It is possible that middle management has a more accurate and timely reading of top management's position at the time of the survey simply because they are closer to them organizationally, and that in time the rank-and-file employees will come to the same conclusion.

It may seem strange that those who initially introduced and championed the quality effort (top management), would later themselves become a source of resistance. This is largely due to the diametric shift in management philosophy required of TQM. Most managers have not experienced a change of the magnitude of TQM nor managed in an organization of the type TQM will produce (Leader, 1989, pg.69). Research indicates that top management personnel, after starting a quality program and fully intending to implement it completely, often fall back into the management style they have practiced all their lives (Johnston, 1989, pg. 106).

Once a quality program is set in motion by top management, it is up to lower-level managers to maintain the momentum. Middle management is the linchpin--the link between the executives who make total quality possible and the employees who make it happen (Dodson, 1991, pg. 35). While we may conclude that Mason top management was supportive of the TQM effort (at least initially), it appears that some middle managers critical to its front-line execution were not. During the level 1 training period in which middle managers were responsible for conducting training sessions at individual terminals, some Quality Trainers were "less than enthusiastic" about TQM. Still others, including one manager who held a key position in the company's line chain of command, were openly antagonistic to the whole program. Later, when the Quality Trainers became Quality Coaches for

the CATs, these same managers neglected to provide strong leadership at the terminal facilities. As a result, many CATs floundered and the entire implementation effort at the operating level of the company lost momentum. So, it seems that one significant source of drag in speeding the implementation of TQM throughout Mason was the resistance of middle management itself.

The fact that middle managers are often reluctant change agents should come as no surprise. In a 1989, study of total quality sponsored by the British Quality Association and the Institute of Personnel management found that, among 1700 firms, 91% cited resistance to change <u>on the part of managers</u> as the major obstacle to progress (Ibid., pg. 35). Many managers approach TQM with trepidation. Already threatened by corporate downsizing, they may see TQM as yet another attack on their survival. Many were promoted for their ability to command and control; the sudden request to generate autonomy and teamwork (for example, coaching a CAT) may catch them off guard. (Ibid., pg. 37)

There is another dimension of leadership which significantly affected the implementation of TQM at Mason--that of the Quality Manager. Although Deming is silent on the concept of designating a single person or office to aid in implementation of the quality program, it is not an uncommon practice. In fact, many consider it a necessary "first step" in introducing the revolutionary change of TQM. According to

one researcher who has studied the role of the TQM manager (or coordinator) as a change agent for implementing Total Quality Management, there are seven traits, characteristics, and qualities important in a TQM Coordinator:

1. Integrity and perseverance
2. Credible knowledge of the organization's processes and products
3. Effective interpersonal skills
4. Well developed communication skills
5. Motivation and initiative
6. Innovative ability and imagination
7. Knowledge of quality management theory (Johnston, 1989, pg. 88)

Mason's Quality Manager scores high in all of these areas; any weakness he had early on in quality management theory was compensated by the considerable expertise of the external consultant. Certainly, the early successes of the implementation process speak well for the Quality Manager's abilities and motivation to succeed. However, as the TQM program failed to take hold at the operational level of the company, the QM was seen increasingly as the one responsible for quality in the company (as opposed to a catalyst for bringing about change.) This phenomenon of the quality program evolving from a line to a staff function was detrimental to the implementation effort and counter to the very principles of Deming. According to one researcher, a consistent characteristic of quality programs that don't do

well is that, "after early half-hearted efforts or disappointments (or even successes), management turns its attention elsewhere, leaving the effort to be run by specialists or staff people" (Cornell, Herman, 1989, pg. 56). To some degree, this is what happened at Mason.

2. Strategic Quality Planning

Mason effectively communicated to its work force the importance and long-term nature of its quality program. The company's statement of mission and guiding principles (see page 35) clearly establish a "constancy of purpose" for the organization. Furthermore, management has performed admirably in disseminating that message throughout the organization. Extremely high scores on survey questions (7) and (20) bear this out. Particularly impressive is the rather astounding scores of 4.94 for question (8)--"This company must seek to continually improve its service to customers; "business as usual" simply isn't enough in today's competitive environment", and 4.97 for question (10)--"The future of this company depends upon our ability to provide ever-increasing excellence in our customer service." It is apparent that Mason workers feel "problems of the future command first and foremost constancy of purpose and dedication to improvement of competitive position to keep the company alive and to provide jobs for employees." (Deming, 1982, pg. 25) This consensus is prerequisite to a successful TQM effort as the following

quotation suggests,

> Many corporate executives, consultants, and working-level supervisors believe that becoming a TQM-based firm invariably involves a "culture change" at all levels of the company, and that change must have the visible strong support of the CEO. In almost every case, the decision to make drastic changes stems from a realization that company survival--either immediate or future--is at stake. This reason must be communicated well to all employees, and driven home by a management commitment to major changes. (AW&ST, 1989, pg. 62)

Related to "constancy of purpose"--a company's intention to stay in business by providing product and service of increasing quality, thereby providing continuing employment for all employees--is the issue of job security. Deming says, "Top management should publish a resolution that no one will lose his job for contribution to quality and productivity." (Deming, 1982, pg. 26) Although this has not been done at Mason, it is probably unnecessary. Indications are that management has been proven reliable beyond doubt in this area. Employees know they are not viewed by management as a mere "commodity," but as a valuable resource, and that job security at the company is relatively good (see survey questions (29) and (4).

Another aspect of strategic quality planning is the company's ability to integrate key quality requirements into overall business planning. Here, Mason has made considerable progress through its "corporate planning process." Although the corporate planning process is not part of the quality program per se, there is no question that it is an outgrowth

of the TQM effort. TQM's emphasis on participative management (employee empowerment) and strategic quality focus created an environment in which Mason's corporate planning process could flourish. The corporate planning process began with the corporate mission statement. A corporate planning group (top management) identified nine areas (see Appendix D) the company needed to look at in order to achieve the long-term goals of the mission statement. Small groups (made up of primarily middle managers) were then assigned to identify specific, concrete steps that needed to be taken in order to move the company forward to meet the stated ideals in the nine areas. At the time of the researcher's on-site visit, the small groups had submitted to the planning group 53 recommendations for action. The strongest point of this planning process is that relevant management and employee groups are involved in shaping, even inventing, the change effort. This involvement (as opposed to top-down direction) fosters a sense of personal investment and, hence, commitment (Cornell, Herman, 1989, pg. 56).

3. Human Resource Development and Management

It has been said that "Total quality is a marriage of business strategy and human resource development at the altar of customer service." (Dodson, 1991, pg. 35) Human resource development and management is a broad topic; in the context of this analysis, it will be limited to training, employee

empowerment, and employee performance and recognition.

a. Training

Deming places a great deal of emphasis on the importance of giving employees the necessary training to enable them to do quality work. If that is progressive management thought, then Mason management is ahead of its time. High-quality, thorough employee training seems to have been highly valued and part of Mason's culture since the early days of the company, certainly long before TQM was introduced. This is especially evident in the driver training program in which each potential driver participates in a highly structured and lengthy certification process. As a result, Mason Transporters has an exceptional safety record and its drivers are recognized as some of the most competent in the industry. Every year Mason drivers and supervisors are regularly recognized by state, regional, and national safety organizations.

The company provides equal emphasis to the training of its managers. The management-trainee program is an extensive three-month syllabus which requires each trainee to spend time in the major operating areas of the company, even learning to drive a truck and to conduct terminal dispatch operations. After potential managers have completed the program, they must start as dispatchers and work themselves upward into increasingly responsible supervisory and

management positions (Mason never fills positions from people "outside" the company). In this way, Mason fulfills the admonishment of Deming that "leaders must know the work they supervise." Deming goes on to say, "In most organizations this is only a dream, as the supervisor knows nothing about the job." (Deming, 1982, pg. 54)

To its credit, Mason applied the same training fervor to its implementation of TQM as it did in other areas of the company. Once committed to the TQM program, nothing was held back in the way of educating and indoctrinating managers and employees in the philosophies and methodologies of TQM. Management success in this regard is unquestioned, as has been previously pointed out in the discussion on achieving "constancy of purpose" throughout the organization. The fact that survey question (8)--"I have received training in Deming's fourteen points, also known as Total Quality Management (TQM)," received a score of 4.00 in such a geographically dispersed company, indicates a highly effective training program.

b. Employee Empowerment

A key concept of TQM is that of employee empowerment--the process of "taking power out of the boardroom and bringing decision-making to the factory floor" (Tribus, 1988, pg. 26). Traditionally, top managers have kept tight reins on operations, rendering their decision behind closed

doors. Managers dispense information selectively to only those lower-level employees who "need to know." At the same time, upward communication is filtered through a chain of command. Such practices have a polarizing effect and tend to undermine declarations of teamwork and harmony. (Dodson, 1991, pg. 35)

On the other hand, methods more aligned with the aims of total quality include sharing information, delegating authority, and facilitating participation (i.e. employee empowerment). Companies that believe in these methods assume that the person doing a job knows it best and can be relied on for dedicated performance and sound judgement--if he or she is made part of the team. (Ibid.)

It would appear that Mason has been largely ineffective in implementing the methods of employee empowerment cited above. In fact, Mason's inability (or unwillingness) to decentralize and drive decision-making authority down to lower levels of the organization was probably a key factor in the stagnation of the TQM effort at the operating level of the company. This conclusion is supported by the relatively low score of 3.09 on survey question (33)--"This company is making efforts to give its employees more authority to make decision which affect company operations," and also by various comments made by Mason employees. Following are some examples:

> The corrective action teams were great at finding problems and recommending solutions, but implementation was "zip."
>
> We went to tremendous expense training all of our people, but we never really convinced the corporate executives that change was needed. It is very hard to change a family-owned business...
>
> Well, some people just don't want you messin' on their turf, so to speak. The old story, resistance to change. This leads to stalemate and power struggle, which results in no action, which leads to discouragement.
>
> Often time they (CATs) would spend a lot of time on a problem, only to find that management viewed the problem as unimportant and the whole effort became a waste of time.
>
> They (top management) were only willing to go so far...let things happen but not drive it. They were willing to make process changes in the way we washed tanks but unwilling to make structural changes in the company to empower employees.

The most evident manifestation of employee empowerment, the corrective action teams (CATs) started off in strong fashion but soon became dysfunctional for two reasons: (1) lack of strong leadership on the part of team coaches (some were not supportive of the quality effort); and (2) lack of follow-through by supervisors and managers on CAT suggestions. This problem is addressed by Deming in Out of the Crisis,

> Faced with problems of people (management included), management, in my experience, go into a state of paralysis, taking refuge in formation of QC-Circles and groups for EI, EP, and QWL (Employee Involvement, Employee Participation, and Quality of Work Life). These groups predictably disintegrate within a few months from frustration, finding themselves unwilling parties to a cruel hoax, unable to accomplish anything, for the simple reason that no one in management will take action on suggestions for improvement. (Deming, 1982, pg. 84)

c. Employee Performance and Recognition

Deming believes that tying employee performance to production quotas or targets is useless since quotas do not include any trace of a system by which to help one to do a better job. Although one Mason executive insisted that such methods were not used in the company, survey results indicate otherwise. Question (30)--"my job performance is evaluated through the use of production quotas, or numerical goals of some type." received one of the lowest scores in the survey, 2.88. Maybe this discrepancy is due to lower-level managers and supervisor employing such methods (at least informally) even though higher-level managers make no use of such numerical information.

Mason's position on performance appraisal systems is far more progressive than in most other companies. William W. Scherkenbach counts the formal performance appraisal system as one of the biggest inhibitors to continuing improvement in any organization. Whenever it is used, according to Scherkenbach, there are at least five reasons why it is an inhibitor to continuing improvement. It

- destroys teamwork
- fosters mediocrity
- increases variability
- confounds the people with the other input resources, and
- focuses on the short term. (Scherkenbach, 1986, pg. 48)

Interestingly, Mason has no formal appraisal system

whatsoever. Managers are encouraged to give feedback to their employees on a regular and informal basis. Recognition of superior performance is provided through various company programs such as safe driver awards and membership in the "One Million Mile Club."

4. **Management of Process Quality**

There is little doubt that the very substantial quality training effort in the early days of TQM implementation significantly affected the way employees view their jobs. Per the survey, almost all employees see that "continually improving service to customers," and "ever-increasing excellence in customer service" is the basis for the company's very existence. But the real relevant question is whether or not employees have translated "process thinking" into actual process improvements where the "value-added" work of the company is accomplished. For the most part, that value-added work is <u>delivery of product</u>--the transportation process. Mason's success in applying Statistical Process Control (SPC) to improve its transportation processes (such as delivery time, for example) has been somewhat limited. SPC that is done in this area is handled exclusively by the Quality Manager, and only when such data is specifically requested by a customer, usually a large chemical company like Exxon or Dupont.

Application of SPC at the working level to all company processes has become increasingly scarce since that time when the CATs were most active during the latter half of 1989. Management is well aware that this is a deficiency in their TQM implementation. Says one upper-level manager,

> The company really hasn't made much progress using SPC. Although a few companies require some type of statistical data, it really isn't used as a means to improve quality. Certainly, the company has a long way to go in this area.

Although SPC was never utilized fully, that is not to say that employees never did utilize SPC to pursue process improvements. When the CATs were meeting regularly, the "seven basic tools" for process improvement were often employed to map out, analyze, and improve various processes. Files of CAT meeting minutes are replete with examples of such activity. Following are some of the processes that were being analyzed using SPC:

- draining fuel tanks
- payment of tank cleaning invoices
- isolating root causes of pickup and delivery variation
- improving paper flow with new online billing system
- driver training
- trailer rejection
- loading failures

When the CATs ceased to meet on a regular basis, activities such as these became increasingly infrequent, until at the time of this writing they had all but ceased.

Given the technical nature of SPC, it is not uncommon for this area of TQM to receive resistance from workers and supervisors. Because of the heavy emphasis on quantitative and statistical analysis, Deming's ideas are perhaps the most intellectually challenging of all the quality experts save Taguchi (Traffic Management, July 1990, pg. 30). According to one professional TQM trainer who provides classroom training in SPC,

> I have run post-training surveys six months after the event (training session) and discovered that only about 15% of the course participants are doing anything materially different as a result of the training event. The two reason most often provided for this unfortunate situation were: (1) My boss wouldn't let me use the new method, and (2) I had no opportunity to use it and forgot about it. (Lang, 1991, pg. 9)

Of course, the absence of control charts and fishbone diagrams in Mason terminals does not mean that management is not moving the company toward higher productivity and increasing excellence in customer service. As the upper-level executive quoted previously who, after acknowledging the company's shortcomings in SPC, said,

> ...however, there has been a measurable change in the attitude or corporate climate of the company due to an awareness of the fourteen points. For example, when decisions are made by management, and plans are formulated, the Deming management method comes into play. People ask, is it the Deming way?

Or, as another key manager observed,

> Prior to the beginning of the quality program, top management would typically make decisions based upon a "peak" number, an isolated failure, or a subjective opinion. However, since learning about how variation affects a process, management is much more likely to

consider the capability of the system, the range of variation in a data set, or to simply look for good data before making a decision from a subjective basis.

5. Communication

In line with Deming management philosophy, effective communication is fundamental to creating a "quality focused" company where all of the Fourteen Points can flourish. Driving out fear, breaking down barriers between departments, receiving process improvement input from workers, creating constancy of purpose, and almost all of the Fourteen Points, depend upon open, honest communication throughout an organization. Dr. Deming himself has found that the removal or reduction of fear should be one of the first of his fourteen obligations which management starts to implement, because it affects nine of his other points (Scherkenbach, 1986, pg. 75). Reducing fear is in inseparably tied to improving organizational communication.

Research results indicate that the climate for effective communication within the Mason organization is relatively good. Implementation effectiveness scores for Deming points (8) "Drive out fear," and (9) "Break down barriers" were 3.96 (moderately effective) and 3.59 (somewhat effective). Furthermore, more subjective research indicates a fairly "open" culture not unduly caught up in the trappings of corporate formalities. "Open-door" policies are encouraged, business attire is informal (it is unusual to see

a Mason executive in coat and tie), and a general atmosphere of friendliness and cooperation is pervasive. Furthermore, most employees recognize that Mason, perhaps more than most, is a company that builds long-term relationships with its employees--firings are rare and employee turnover exceptionally low. All of these factors combine to facilitate an open flow of communication throughout the company; this despite its strongly centralized organization and functional structure.

V. CONCLUSION

A. SUCCESSES/SHORTCOMINGS

In the mid-1980's, Mason Transporters found itself confronting two powerful forces in the transportation environment, deregulation and a growing demand from shippers for increasingly rigid quality standards. With deregulation came a proliferation of new carriers into the market, introducing a dimension of competitiveness never before seen by the company. The quality movement, which swept through American manufacturing in the early 1980's, had "trickled down" to large chemical producers who in turn demanded that their transportation suppliers "get aboard" the quality train. Hence, Mason was faced with a momentous decision: embark on a program to formally implement a quality program, or face the potential loss of major customers. In view of the new competitive environment, the decision was not a difficult one to make--they chose TQM. Although the decision may have been easy, the implementation process was clearly not.

In implementing TQM, Mason managers were beginning a process requiring a fundamental change in corporate thought, action, and culture. So significant is the change required that one researcher describes it as a "paradigm shift,"

> Total Quality Management leads to a total shift in management philosophy. When first introduced to the

> concepts of Total Quality Management, most American managers appreciate the logic and obvious benefits. Many get enthusiastic and decide to implement TQM in their organizations. The initial implementation efforts usually give way to a sobering realization that TQM represents a total shift in management philosophy. This shift is of such magnitude that it is best described as a "paradigm shift." A paradigm is a pattern or set of rules that establish fundamental limits and boundaries on the way we look at things, the way we think, and the way things are done. The problem with a paradigm is if too many of the changes conflict with our previous learning and experience, they are hard to assimilate. A paradigm is a total shift in that pattern. The reason why TQM is a paradigm is because the side-by-side comparison with traditional management philosophy is so glaringly different. It is a total shift in culture. (Johnston, 1989, pg. 25)

And yet, despite the formidable challenge of implementing TQM, there is no question that the quality program was a success in many ways. First, and perhaps most significantly, TQM changed the way people in the company think. At Mason Transporters, managers no longer make decisions based on a single "peak" number, an isolated failure, or subjective opinion. Rather, they tend to consider the capability of a system, the range of variation in a data set, or to simply look for "hard data" before coming to a conclusion.

Secondly, TQM changed the relationship between top managers and middle managers, and between supervisors and hourly workers. In dealing with subordinates, managers and supervisors are constantly reminded, "is it the Deming way?" Top-down, authoritative direction is not accepted as readily as it once was, and employees and middle managers expect a say in the decision-making process. This participative problem-

solving is precisely what is needed in the newly competitive, deregulated environment facing Mason Transporters. In the past, under a regulated market, the "status quo mentality" was probably sufficient. However, the company must now continually look for fresh ideas and better solutions to retain its edge over competitors.

Thirdly, TQM, with its strong customer focus, provided a "bridge" for Mason managers to cross from a regulated mentality to a market-driven mentality. Before deregulation, the company was not so concerned with customer satisfaction; external regulatory barriers made market share and profit margin relatively secure. After deregulation, the Deming philosophy taught managers that a strong customer focus could create competitive advantage within the organization through product (service) differentiation.

Fourthly, TQM brought "constancy of purpose" to the company. The company's Mission Statement (to constantly improve services to meet customers' needs), Guiding Principles, and Deming's 14 points were successfully institutionalized and made part of company culture. Most employees are aware that the price of poor service quality could well be the company itself. Accordingly, all work in a unified fashion, whatever their job, to promote increasing excellence in customer service.

Additionally, from the standpoint of Deming management philosophy, there are many strong "quality" characteristics

within the company. Training is taken very seriously and consumes a significant portion of the company's resources. A cooperative, informal working environment facilitates communication, both up and down the chain of command and across functionally different staff areas. Mason is a company that values its people as a resource to be cherished and developed (as opposed to being treated as a commodity). Employees recognize this and respond in kind with a devotion and commitment to the company. Although its follow-through might be found lacking, top management made an aggressive and bold step in directing the company down the path of TQM, a big step for a relatively staid, family owned business, which had its birth and growth in a regulated environment.

Despite the successes of the TQM implementation effort, and the strong "quality" characteristics of the company, there were some significant shortcomings. After a flurry of activity consisting of a massive training effort and company-wide mobilization of Corrective Action Teams (CATs), the movement quickly peaked and began to lose steam. Few CAT-suggested changes were actually made in company operations, and those middle managers who were genuinely enthused about the program began to doubt the commitment of top management. As a result, the CATs slowly disbanded, and real implementation of TQM at the operational level of the company was only marginally accomplished.

In general, the most notable shortcoming of the TQM program was management's inability to translate total quality concepts into meaningful organizational change. Specifically, three years after the program began, the company can document no significant changes relative to methods/policy, structure, productivity, or product quality. This unhappy state of events stems primarily from management's failure to introduce a process for change within the organization. When the quality program was implemented and corrective action teams formed, they were unclear of their mission, goals, and their role within the organization. The lack of "a new corporate order" meant that change had to be driven by the old organizational structure. Since resistance is a natural part of change, it is illogical to assume that the old organization would facilitate the necessary change from within. Those who saw the new quality program as a threat to their own power or "turf," quickly moved to shut down the fledgling effort, often simply by ignoring it. This they did with impunity, as they were still operating under the old organizational environment which rewarded the status quo. In summary, management's attempt to impose a completely new discipline upon the company with no concurrent change in organizational structure doomed the effort to a less than successful implementation.

Why were managers reluctant to make structural changes during the implementation effort? Perhaps they were simply prisoners of their past experiences. For many years (since

the inception of the company, really), the status quo in the regulated industry had been very rewarding. This, coupled with the fact that change is uncertain, uncomfortable, and downright risky, lead management into a state of paralysis. The company's deteriorating financial performance in the late 1980s told management that the status quo would not longer ensure profitability, yet change was so painful that they could not take truly meaningful steps forward. The step they did take, the implementation of TQM, was in some ways a half-hearted one in that it presented the vision of radical change on the surface, while underneath the company just kept doing the same things in the same way.

B. RECOMMENDATIONS

At this point in Mason's implementation process, the company needs to regroup and address three issues, all related to the most significant obstacle to TQM--resistance to change: the company's organizational structure, the speed of implementation, and top management commitment.

First, as stated previously, trying to implement change as radical as TQM into an organization without changing the organizational structure is like "putting new wine into old wineskins." It just doesn't work. Company executives must decentralize the structure of the company and somehow create a "shared power" culture where employee involvement and joint problem solving is encouraged and rewarded. Supervisors and

managers at the operational level must be "retrofitted" with the necessary "people skills" to create a positive work environment and then guide the initiative and teamwork that grow from it (Dodson, 1991, pg. 36). Managers who are resistant to total quality principles and cannot be retrained should be transferred out of the line chain of command. Furthermore, to achieve a "flatter" organizational structure, management layers between terminal supervisors and the company president should be reduced.

Secondly, rather than getting discouraged and retreating from TQM, management must recognize that the implementation process requires time and perseverance. It must understand that total quality is a journey across unfamiliar territory, and that missteps signal progress, not failure (Ibid., pg. 37). Most importantly, management should recognize the failure of its "shotgun" approach to TQM implementation; trying to implement the spectrum of TQM across the entire company at one time was simply too ambitious. Instead, TQM should be slowly administered in an <u>incremental</u> fashion. For example, a renewed TQM effort could be extended to only those terminal that want to be involved--a "pull" rather than a "push" approach. Within these terminals the implementation strategy could begin with several small scale pilot projects, which allowed for mistakes, gradual learning and restarts. Once the patterns for success were in place, the change effort could be extended to other terminals and into all functional

areas gradually. (Cornell, Herman, 1989, pg. 57) In short, Mason managers must realize that large improvements in quality are the results of many small actions. As one writer puts it,

> Simultaneously improving cost, quality and schedule is not a game normally advanced by home runs. It is a game of singles. It is the incremental nature of each small advance towards total quality management that makes its achievement such a competitive advantage...Many small changes together result in a new operating culture and make an enormous difference in quality and cost--even with the same workforce. (Leader, 1989, pg. 67)

Thirdly, lack of support for the quality program from top management, whether real or perceived, must be addressed. The president and all line executives directly under him must be 100% committed to total quality principles. The success of the quality program is dependent upon top management's ability to project a vision of what they want for the people and the organization. They should adopt the principle of spreading the change message by leading by example. Rather than lecturing and then leaving the job to staff specialists, high-level managers must concentrate on their own understanding, acceptance and personal experience with the change effort. They must then pass on to the next lower level those opinions on how to make the effort work. (Ibid., pg. 56)

APPENDIX A: DEMING POINTS GROUPED BY CRITICAL AREA

1. LEADERSHIP

Deming pt. 2: Adopt the new philosophy
Deming pt. 7: Institute leadership
Deming pt. 11: Eliminate numerical quotas: substitute leadership
Deming pt. 14: Take action to accomplish the transformation

2. STRATEGIC QUALITY PLANNING

Deming pt. 1: Create constancy of purpose for the improvement of service

3. HUMAN RESOURCE DEVELOPMENT AND MANAGEMENT

Deming pt. 6: Institute training on the job
Deming pt. 13: Institute a vigorous program of education and self-improvement
Deming pt. 12: Remove barriers to pride in workmanship

4. MANAGEMENT OF PROCESS QUALITY

Deming pt. 4: End the practice of awarding business on price tag alone
Deming pt. 5: Improve constantly and forever the system of production and service
Deming pt. 3: Cease dependence on mass inspection

5. COMMUNICATION

Deming pt. 9: Break down barriers between staff areas
Deming pt. 10: Eliminate slogans, exhortations and targets for the work force
Deming pt. 8: Drive out fear

APPENDIX B: BREAKDOWN OF CRITICAL AREAS

1. LEADERSHIP

-How committed is top management to the quality program?
-Are they symbolically and actively involved?
-Do they meet individually with customers and employees?
-What barriers have been removed which inhibit people from reaching their full potential?
-Have numerical or quota-type work standards been eliminated? Is management by numbers practiced?
-What has been done to signal to employees that "business as usual" just isn't good enough anymore?
-What are you doing to make quality (and productivity) everybody's job, including management?

2. STRATEGIC QUALITY PLANNING

-With regard to "constancy of purpose", what is the purpose?
-Are all employees aware of this purpose?
-How are key quality requirements integrated into overall business planning?
-Has senior management been trained in the Deming management philosophy?
-Has a "critical mass" of people attended Deming training?
-Has the company published/disseminated its mission?
-Has management committed to attrition for reduced personnel requirements?
-What process is in place to determine customer needs?

3. HUMAN RESOURCE DEVELOPMENT AND MANAGEMENT

-What are you doing to create teamwork between purchasing and production?
-Is training part of everyone's objectives?
-Does employee empowerment really exist?
-Are employee education and training programs effective?
-What percentage of revenues are spent on education and training?
-How are employee contributions to company and quality performance objectives solicited and acted upon?
-Are employee attitude surveys conducted?

-When things go wrong, are employees punished or do they receive coaching and support?
-Is personal initiative valued or feared?
-How are foremen selected and trained?
-What are you doing to improve the training of new employees?
-Do you encourage self-improvement of your people? How?
-Do you form employee involvement groups only to leave them stranded without participation in management?
-Do people in management receive an annual performance rating?

4. COMMUNICATION

-Do teams exist to analyze and improve processes with the aim of meeting company goals? Are these teams made up of people from different areas in the company?
-What do employees consider "meaningless slogans"?
-Do barriers exist between different staff areas?
-Is there an established procedure to hear and act on employee suggestions?
-Is there an open avenue of communication between employees and supervisors?
-To what extent does fear exist in the company? What is being done to eliminate/reduce that fear?

5. MANAGEMENT OF PROCESS QUALITY

-How does the company define "quality"?
-How do you measure it?
-How does this company operationally define "continuing improvement?
-What is the most important process in the operation of this company? How do you know if that process is stable?
-Is quality improvement viewed in terms of "process thinking"?
-Have processes been mapped out (process flow diagrams), measured, and controlled through statistical methods?
-When purchasing decisions are made, is business awarded on the basis of price tag alone?
-Do you have more than one vendor from any item that purchase repeatedly?
-Does your purchasing department go with the lowest bidder?
-What arrangements have you made with your suppliers for receipt from them of evidence of statistical control, so that you may safely decrease inspection?
-Is quality data available?
-Where do employees go for help in implementing SPC?

-Where does this company rely on mass inspection and what is being done to eliminate it?

(Questions compiled largely from three sources: Garvin, 1991, pg. 88; Scherkenbach, 1986, pg. 142; Deming, 1982, pg. 156)

APPENDIX C: SURVEY QUESTIONNAIRE

1=strongly disagree; 2=somewhat disagree;
3=indifferent; 4=somewhat agree; 5=strongly agree

3.85 1. My supervisor is more of a coach than a "boss"; he is a source of encouragement and support.

3.64 2. Personal initiative is highly valued at this company.

4.48 3. Top management is committed to the Quality Program in this company.

3.64 4. This company views its people as its most important resource.

3.45 5. Different departments/divisions generally work well together in this company.

3.15 *6. Teamwork is lacking in this company; the operating philosophy seems to be "every man for himself!"

4.30 7. I am familiar with this company's "statement of mission" and its "guiding principles."

4.94 8. This company must seek to continually improve its service to customers; "business as usual" simply isn't enough in today's competitive environment.

4.03 9. I have received training in Deming's fourteen points, also known as Total Quality Management (TQM).

4.97 10. The future of this company depends upon our ability to provide ever-increasing excellence in our customer service.

4.24 *11. My supervisor is just waiting for me to screw up so he can nail me.

4.36 12. I feel free to express ideas to my supervisor about how to make improvements in my area of responsibility.

3.97 *13. This company is more interested in meeting numerical goals and targets than in "continuous improvement."

3.67 14. Management does a good job in helping different staff areas work together.

4.33 15. This company is serious about job training.

4.21 16. This company is prepared to make the dramatic changes necessary to implement a true quality program.

3.79 17. This company is interested in my well-being and professional development.

2.33 *18. I learned how to do my job from fellow workers.

4.00 19. My supervisor has a good handle on what my job is really all about.

4.48 *20. All the talk about the need to improve "service quality" is nonsense; if we weren't doing things right, we wouldn't be in business today.

4.27 *21. I am too busy "putting out fires" to think about how the quality of my own work can be improved.

3.67 *22. When this company buys equipment, supplies or services, price rather than quality is the primary consideration.

3.79 *23. If this company increases service quality, overall operating costs will also increase.

4.45 *24. My supervisor wants the job done quickly, not properly.

3.67 25. My supervisor is interested in removing those barriers that keep me from doing a good job.

3.39 26. I have received training in Statistical Process Control (SPC) including the use of control charts, flow diagrams, pareto diagrams, and other tools of statistical analysis.

2.79 27. Top management often walks around the company to talk to employees and find out "what's really going on."

2.58 28. My superior(s) lead by example; they don't just tell me what to do, they get out there and do it themselves.

4.18 29. Job security is good at this company; when times are tough, employees are layed-off only as a very last resort.

2.88 *30. My job performance is evaluated through the use of production quotas, or numerical goals of some type.

4.21 31. I feel free to talk to my superiors about problems that interfere with the quality of my work.

4.48 32. I have received sufficient training to perform my job.

3.12 33. This company is making efforts to give its employees more authority to make decision which affect company operations.

3.48 *34. When things go wrong, management usually looks for someone to blame it on.

*this score has been reverse scored, so that a higher value indicates higher "quality."

NOTE: Average scores are given to the left of each question.

APPENDIX D: NINE CORPORATE PLANNING PROCESS AREAS

CUSTOMERS: Mason Transporters will seek partnerships with our customers based on mutual trust and our ability to provide value added transportation services of the highest quality at a competitive price. The customer will be financially stable, conscious of safety and environmental responsibilities to the public and fit into the company's growth objective.

CUSTOMER SERVICE/QUALITY: Mason Transporters will meet or exceed our customers' expectations with the objective of constantly improving customer service thereby providing innovative, value-added service of the highest quality at competitive rates.

SAFETY: Mason Transporters will place the safety of our employees, the general public and our customers above all other concerns.

PUBLIC RESPONSIBILITY: Mason Transporters is a highly visible company that will uphold the public trust through proper actions in the areas of the environment, public safety and life in general for the communities in which we domicile and travel.

PEOPLE: Mason Transporters will encourage self-motivation by empowering employees to do their jobs which will allow a feeling of satisfaction and achievement. The company will provide an environment for worker accountability and at the same time provide employment with competitive wages and benefits. The workers will possess integrity, knowledge and understand their role in meeting company objectives.

MANAGEMENT: Mason Transporters Management will provide an environment with high performance expectations that are realistic and achievable and will also provide the support systems that allow the employees to meet these expectations and to reach their fullest potential.

GROWTH: Mason Transporters will pursue growth through present and future markets. Our first priority is to grow with present customers. Expansion will be designed to improve service, improve traffic balance, utilize present equipment and maximize capacity. The company will also attempt to differentiate itself with new products and services, replace matured market segments and acquire

companies in growth sectors.

SUPPLIERS: Mason Transporters is committed to forming long-term, mutually beneficial relationships with its vendors. They should be financially stable, conscious of safety and environmental responsibilities to the public and understand the processes of the company.

PROFIT: Mason Transporters will achieve sufficient profit to finance company growth and other corporate objectives while providing reasonable return to our investors.

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